



**BALTIMORE
METROPOLITAN
COUNCIL**

**Project 22T04:
Transportation Impact Study (TIS)
Guidelines – Phase II**

**Final Report:
Templates for Additional Parameters/Topics
and Suggested Implementation Process**

September 14, 2022

Prepared By:

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I. Introduction

The Baltimore Metropolitan Council (BMC) performs activities that promote an integrated approach to transportation issues within the region. Recognizing that new developments often have impacts beyond those identified through the traditional Transportation Impact Study (TIS) process, BMC wishes to develop methods to comprehensively assess those additional impacts. These proposed methods could be used by BMC member agencies to better understand and manage the additional impacts associated with a proposed development.

BMC initiated the subject project (TIS Guidelines – Phase II) to build upon the recommendations found in the “Regional Traffic Impact Study Guidelines” (November 2020). That document identified “Additional Parameters for Consideration” in traditional TISs, and also identified “Potential Topics to Address in Expanded Transportation Impact Studies”. The Phase II project is being facilitated by the Phase II Steering Committee (P2SC), which consists of the BMC Project Manager, representatives of the agencies who have direct responsibility and oversight for TIS reviews, and the Consultant Team. The agencies consist of each of the eight member jurisdictions of the BMC, plus the Maryland Department of Transportation State Highway Administration (MDOT SHA).

Based on an initial review of the parameters/topics identified by BMC for further development and suggestions from the Consultant Team, the eight parameters/topics of interest for the current study are shown in **Table 1**. The Consultant Team determined that some of the parameters/topics can readily be added to existing TIS procedures. Some of them, however, would be likely to require substantial modification of existing procedures.

Table 1: Parameters/Topics of Interest in Phase II

Parameter/Topic		Additional Information	Can this parameter generally be accommodated within existing TIS frameworks?	
Number	Description		Yes	No
1	Making safety analyses a key consideration...	...of all TISs and coordination with state and local Strategic Highway Safety Plans.	X	-
2	Controlling speeds...	...for safer mobility for all users of the roadway network – pedestrians, cyclists, freight, as well as passenger vehicles.	X	-
3	De-prioritizing vehicular throughput...	...for safer mobility for all users of the roadway network – pedestrians, cyclists, freight, as well as passenger vehicles.	X	-
4	Use of multi-modal performance metrics and multi-modal analyses.	Use of metrics such as travel time reliability to assess impacts of development.	X	-
5	Addressing impacts of multiple proposed developments,...	...especially in a dense urban area, on the highway network beyond the immediate vicinity of each development.	X	-
6	Balancing the needs of more housing and business with less traffic...	...while maintaining safety and mobility.	-	X
7	Need for post-development audit –thresholds, mitigation measures, factors not considered at the time of TIS development that may have an impact on a study area	-	X
8	Need for different TIS requirements...	...based on area type, level of existing development, transit and multi-modal availability, etc.	-	X

To assess each parameter/topic, the Consultant Team developed a table-based approach which includes factors that may be applied to the parameter/topic, as well as potential means of evaluating those factors. “Technical Memorandum No. 1: Assessment of Parameters/Topics” was prepared to present these tables and included both quantitative and qualitative measurement options to consider for each of the following factors:

- Performance metric(s)
- Means of assessment
- Threshold of acceptability
- Data availability/expense
- Ease/standardization of analysis
- Availability of reasonable mitigation strategies
- Alternatives if no reasonable mitigation strategies
- Ease of review by jurisdiction
- Likely challenges

A review meeting was held on April 19, 2022 with BMC and the other P2SC members to discuss “Technical Memorandum No. 1: Assessment of Parameters/Topics”. The intent of the review meeting was to provide guidance to the Consultant Team regarding:

- Should all eight parameters/topics continue to be considered during this project?
- Should qualitative measurement, quantitative measurement, or both be used for each individual parameter/topic? (The answer could be different for different parameters/topics.)
- Which Performance Metrics should be the focus of the remainder of the project?

There was no indication from the P2SC members that any of the parameters/topics should be removed from consideration or whether qualitative or quantitative measurement was preferred. As such, all parameters/topics were considered in this Final Report.

II. Organization of this Document

This report is organized to first discuss the development of the evaluation templates for each of the parameters/topics, followed by a presentation of the evaluation templates for each parameter/topic. The last section of the report presents a discussion of the suggested implementation process, including potential case study scenarios for examination, guidance on selecting parameters/topics, and revision of TIS guidelines.

III. Development of Evaluation Templates

Separate templates (generally formatted along the lines of the assessment tables previously included in “Technical Memorandum No. 1: Assessment of Parameters/Topics”), were developed for each of the eight parameters/topics. A sample template, using the Safety Analyses parameter/topic as an example, is shown in **Figure 1**, with the additions to the assessment table highlighted for clarity. Examination of **Figure 1** shows the following:

1. Three columns were added. The purpose of these columns is to allow an individual to evaluate each line item in the template.
2. Each line item in the new columns has text in italics. This text is intended to assist an individual in determining an appropriate range of responses for that line item.
3. An “Analyst/Date/Project” box has been added to the top. The purpose of this box is to allow an individual to keep separate files of separate iterations of the template.
4. At the bottom of the template, there are several boxes to allow the analyst to develop a recommendation regarding the parameter/topic and provide the reason(s) for that recommendation.

Figure 1: Sample Assessment Template

Assessment of Parameter/Topic: Safety Analyses

Analyst:	Date:	Project:
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	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Performance Metric(s)	• Number of crashes (per year)	• <i>(Yes/No)</i>	• Compliance with Statewide Strategic Highway Safety Plan	• <i>(Yes/No)</i>	• For intersections, use rates per entering vehicle?	• <i>(Yes/No/Not applicable/Text)</i>
	• Crash severity	• <i>(Yes/No)</i>	• Compliance with BMC's Strategic Highway Safety Plan	• <i>(Yes/No)</i>	• Other performance metrics could be considered	• <i>(Yes/No/Not applicable/Text)</i>
	• Crash rate (per 100 million vehicle miles (MVM), or per entering vehicle)	• <i>(Yes/No)</i>	• Compliance with Jurisdiction's Strategic Highway Safety Plan	• <i>(Yes/No)</i>		
	• Number of fatalities	• <i>(Yes/No)</i>	• Extent to which the project implements the member jurisdiction's Complete Streets policies	• <i>(Yes/No)</i>		
	• Number of serious injuries	• <i>(Yes/No)</i>	• Extent to which the project implements the member jurisdiction's Vision Zero Statement	• <i>(Yes/No)</i>		
	• Fatality rate per 100 million vehicle miles traveled (VMT)	• <i>(Yes/No)</i>	• Presence of project within known High Crash Location	• <i>(Yes/No)</i>		
	• Serious injury rate per 100 million VMT	• <i>(Yes/No)</i>	• Compliance with design standards	• <i>(Yes/No)</i>		
	• Number of non-motorized fatalities and serious injuries	• <i>(Yes/No)</i>				
• Number of crashes involving pedestrians and/or bicyclists	• <i>(Yes/No)</i>					
Means of Assessment	• Before/after studies	• <i>(Yes/No)</i>	• Written Statement of Compatibility with performance metric(s) described above	• <i>(Yes/No)</i>	• Document how the proposed improvements within the study area will address identified safety issues?	• <i>(Yes/No/Not applicable/Text)</i>
	• Highway Safety Manual procedures	• <i>(Yes/No)</i>			• Other means of assessment could be considered	• <i>(Yes/No/Not applicable/Text)</i>
	• Road safety audits	• <i>(Yes/No)</i>				
Threshold of Acceptability	• Decrease, or at least no increase, in performance metrics	• <i>(Yes/No)</i>	• Full compatibility	• <i>(Yes/No)</i>	• Other thresholds could be considered	• <i>(Yes/No/Not applicable/Text)</i>
Data Availability / Expense	• Historic crash data available from MDOT SHA for counties; available from Baltimore City DOT for City	• <i>(Yes/No)</i>	• Not applicable	• <i>(Not applicable)</i>	• Time required for obtaining data may be a concern	• <i>(Yes/No/Not applicable/Text)</i>
					• Level of detail of data may be a concern	• <i>(Yes/No/Not applicable/Text)</i>
					• Legality of providing data to developers may be a concern	• <i>(Yes/No/Not applicable/Text)</i>

Figure 1: Sample Assessment Template (Continued)

Assessment of Parameter/Topic: Safety Analyses (Continued)

	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Ease / Standardization of Analysis	• Require use of Interactive Highway Safety Design Model (IHSDM)?	• <i>(Yes/No)</i>	• Straightforward	• <i>(Agree/Disagree with Assessment)</i>	• Other types of analysis could be considered	• <i>(Yes/No/Not applicable/Text)</i>
	• Require use of HCS Module?	• <i>(Yes/No)</i>				
Availability of Reasonable Mitigation Strategies	• Geometric improvements	• <i>(Yes/No)</i>	• Geometric improvements	• <i>(Yes/No)</i>	• Physical/operational improvements may not always be possible, or cost effective	• <i>(Yes/No/Not applicable/Text)</i>
	• Operational improvements (including signing/pavement markings and lighting)	• <i>(Yes/No)</i>	• Operational improvements (including signing/pavement markings and lighting)	• <i>(Yes/No)</i>	• Some mitigation strategies (such as changes to signing/pavements markings and automated enforcement), may be suggested in the TIS, but can only be implemented by the jurisdiction	• <i>(Yes/No/Not applicable/Text)</i>
Alternatives if No Reasonable Mitigation Strategies	• Impact fees	• <i>(Yes/No)</i>	• Impact fees	• <i>(Yes/No)</i>	• Can improvements for other parameters/topics be used for an offset?	• <i>(Yes/No/Not applicable/Text)</i>
Ease of Review by Jurisdiction (Easy, Moderate, Difficult)	• Moderate	• <i>(Agree/Disagree with Assessment)</i>	• Easy	• <i>(Agree/Disagree with Assessment)</i>	• Quantitative analyses could be challenging to review, particularly at outset of program	• <i>(Yes/No/Not applicable/Text)</i>
Likely Challenges	• Accurate assessment of performance metrics	• <i>(Insert any other specific challenges)</i>	• Difficult to assess meaningfully	• <i>(Insert any other specific challenges)</i>	• Past experiences by member agencies could be instructive	• <i>(Yes/No/Not applicable/Text)</i>
					• Including safety as part of the TIS process would potentially require jurisdictions to change their Adequate Public Facilities Ordinance	• <i>(Yes/No/Not applicable/Text)</i>

From a technical analysis perspective, can this parameter generally be accommodated within existing TIS frameworks?

Yes: No:

Jurisdiction Staff Recommendation for Including This Parameter/Topic:

Yes:	<input type="checkbox"/>
No:	<input type="checkbox"/>

Jurisdiction Staff Discussion of Recommendation:

Jurisdiction Staff Recommendation for Measurement Type:

Qualitative Measurement:	<input type="checkbox"/>
Quantitative Measurement:	<input type="checkbox"/>
Both:	<input type="checkbox"/>
Not Applicable:	<input type="checkbox"/>

The intent of these templates is to allow an individual, or perhaps multiple individuals within an agency, to work through the “advantages and disadvantages” of adding a given parameter/topic to the agency’s TIS procedures. These templates will also allow each agency to customize a given parameter/topic to best suit its needs as it develops the details of incorporating that parameter/topic.

IV. Evaluation Templates for Each Parameter/Topic

The evaluation templates for each parameter/topic are presented below. As noted above, there are blank columns included for each of the categories (Quantitative Measurement, Qualitative Measurement, and Comments) to allow for jurisdiction staff assessment. Italicized text is included within these columns to guide potential responses. As was the case with the earlier assessment tables, some cells are currently empty where nothing substantial was felt to be appropriate for insertion.

In order to visually link the appropriate columns, Quantitative Measurement information is shaded in blue, Qualitative Measurements information is shaded in green, and Comments information is shaded in orange. The templates have been provided in Microsoft Word format, as an attachment to this Final Report, for use by the P2SC.

Assessment of Parameter/Topic: Safety Analyses

Analyst:	Date:	Project:
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	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Performance Metric(s)	• Number of crashes (per year)	• <i>(Yes/No)</i>	• Compliance with Statewide Strategic Highway Safety Plan	• <i>(Yes/No)</i>	• Although speed is often included in safety evaluations, it is treated as a separate parameter/topic.	• <i>(Yes/No/Not applicable/Text)</i>
	• Crash severity	• <i>(Yes/No)</i>	• Compliance with BMC's Strategic Highway Safety Plan	• <i>(Yes/No)</i>		
	• Crash rate (per 100 million vehicle miles (MVM), or per entering vehicle)	• <i>(Yes/No)</i>	• Compliance with Jurisdiction's Strategic Highway Safety Plan	• <i>(Yes/No)</i>	• For intersections, use rates per entering vehicle?	• <i>(Yes/No/Not applicable/Text)</i>
	• Number of fatalities	• <i>(Yes/No)</i>	• Extent to which the project implements the member jurisdiction's Complete Streets policies	• <i>(Yes/No)</i>	• Other performance metrics could be considered	• <i>(Yes/No/Not applicable/Text)</i>
	• Number of serious injuries	• <i>(Yes/No)</i>	• Extent to which the project implements the member jurisdiction's Vision Zero Statement	• <i>(Yes/No)</i>		
	• Fatality rate per 100 million vehicle miles traveled (VMT)	• <i>(Yes/No)</i>	• Presence of project within known High Crash Location	• <i>(Yes/No)</i>		
	• Serious injury rate per 100 million VMT	• <i>(Yes/No)</i>	• Compliance with design standards	• <i>(Yes/No)</i>		
	• Number of non-motorized fatalities and serious injuries	• <i>(Yes/No)</i>				
• Number of crashes involving pedestrians and/or bicyclists	• <i>(Yes/No)</i>					
Means of Assessment	• Before/after studies	• <i>(Yes/No)</i>	• Written Statement of Compatibility with performance metric(s) described above	• <i>(Yes/No)</i>	• Document how the proposed improvements within the study area will address identified safety issues?	• <i>(Yes/No/Not applicable/Text)</i>
	• Highway Safety Manual procedures	• <i>(Yes/No)</i>			• Other means of assessment could be considered	• <i>(Yes/No/Not applicable/Text)</i>
	• Road safety audits	• <i>(Yes/No)</i>				
Threshold of Acceptability	• Decrease, or at least no increase, in performance metrics	• <i>(Yes/No)</i>	• Full compatibility	• <i>(Yes/No)</i>	• Other thresholds could be considered	• <i>(Yes/No/Not applicable/Text)</i>
Data Availability / Expense	• Historic crash data available from MDOT SHA for counties; available from Baltimore City DOT for City	• <i>(Yes/No)</i>	• Not applicable	• <i>(Not applicable)</i>	• Time required for obtaining data may be a concern	• <i>(Yes/No/Not applicable/Text)</i>
					• Level of detail of data may be a concern	• <i>(Yes/No/Not applicable/Text)</i>
					• Legality of providing data to developers may be a concern	• <i>(Yes/No/Not applicable/Text)</i>

Assessment of Parameter/Topic: Safety Analyses (Continued)

	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Ease / Standardization of Analysis	• Require use of Interactive Highway Safety Design Model (IHSDM)?	• (Yes/No)	• Straightforward	• (Agree/Disagree with Assessment)	• Other types of analysis could be considered	• (Yes/No/Not applicable/Text)
	• Require use of HCS Module?	• (Yes/No)				
Availability of Reasonable Mitigation Strategies	• Geometric improvements	• (Yes/No)	• Geometric improvements	• (Yes/No)	• Physical/operational improvements may not always be possible, or cost effective	• (Yes/No/Not applicable/Text)
	• Operational improvements (including signing/pavement markings and lighting)	• (Yes/No)	• Operational improvements (including signing/pavement markings and lighting)	• (Yes/No)	• Some mitigation strategies (such as changes to signing/pavements markings and automated enforcement), may be suggested in the TIS, but can only be implemented by the jurisdiction	• (Yes/No/Not applicable/Text)
Alternatives if No Reasonable Mitigation Strategies	• Impact fees	• (Yes/No)	• Impact fees	• (Yes/No)	• Can improvements for other parameters/topics be used for an offset?	• (Yes/No/Not applicable/Text)
Ease of Review by Jurisdiction (Easy, Moderate, Difficult)	• Moderate	• (Agree/Disagree with Assessment)	• Easy	• (Agree/Disagree with Assessment)	• Quantitative analyses could be challenging to review, particularly at outset of program	• (Yes/No/Not applicable/Text)
Likely Challenges	• Accurate assessment of performance metrics	• (Insert any other specific challenges)	• Difficult to assess meaningfully	• (Insert any other specific challenges)	• Past experiences by member agencies could be instructive	• (Yes/No/Not applicable/Text)
					• Including safety as part of the TIS process would potentially require jurisdictions to change their Adequate Public Facilities Ordinance	• (Yes/No/Not applicable/Text)

From a technical analysis perspective, can this parameter generally be accommodated within existing TIS frameworks?

Yes: **X** No:

Jurisdiction Staff Recommendation for Including This Parameter/Topic:

Yes:	<input checked="" type="checkbox"/>
No:	<input type="checkbox"/>

Jurisdiction Staff Discussion of Recommendation:

Jurisdiction Staff Recommendation for Measurement Type:

Qualitative Measurement:	<input type="checkbox"/>
Quantitative Measurement:	<input type="checkbox"/>
Both:	<input type="checkbox"/>
Not Applicable:	<input type="checkbox"/>

Assessment of Parameter/Topic: Controlling Speeds

Analyst:	Date:	Project:
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	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Performance Metric(s)	• Compliance with posted speed limit	• <i>(Yes/No)</i>	• Extent to which the project implements the member jurisdiction’s Complete Streets policies	• <i>(Yes/No)</i>	• For “difference in mean speed”, the greater the differential is, the greater the potential is for conflict	• <i>(Yes/No/Not applicable/Text)</i>
	• Design speed of new roadways	• <i>(Yes/No)</i>				
	• Difference in mean speed among modes	• <i>(Yes/No)</i>				
Means of Assessment	• Before/after studies	• <i>(Yes/No)</i>	• Written Statement of Compatibility with performance metric described above	• <i>(Yes/No)</i>	• To simplify data collection, a mean speed for pedestrians and for bicycles could be assumed	• <i>(Yes/No/Not applicable/Text)</i>
	• Mean speed of roadway vehicles	• <i>(Yes/No)</i>				
	• Mean speed of all modes	• <i>(Yes/No)</i>				
	• Percentage of vehicles exceeding posted speed limit	• <i>(Yes/No)</i>				
Threshold of Acceptability	• Increase in compliance with posted speed limit; decrease in other performance metrics	• <i>(Yes/No)</i>	• Full compatibility with the performance metric described above	• <i>(Yes/No)</i>		• <i>(Not applicable/Text)</i>
	• Compliance with design standards for new roadways	• <i>(Yes/No)</i>				
Data Availability / Expense	• Standard traffic data collection	• <i>(Yes/No)</i>	• Not applicable	• <i>(Not applicable)</i>		• <i>(Not applicable/Text)</i>
Ease / Standardization of Analysis	• Straightforward	• <i>(Agree/Disagree with Assessment)</i>	• Straightforward	• <i>(Agree/Disagree with Assessment)</i>		• <i>(Not applicable/Text)</i>
Availability of Reasonable Mitigation Strategies	• Geometric improvements	• <i>(Yes/No)</i>	• Geometric improvements	• <i>(Yes/No)</i>	• Physical/operational improvements may not always be possible, or cost effective	• <i>(Yes/No/Not applicable/Text)</i>
	• Operational improvements (including signing/pavement markings and lighting)	• <i>(Yes/No)</i>	• Operational improvements (including signing/pavement markings and lighting)	• <i>(Yes/No)</i>	• Some mitigation strategies may lead to modal conflicts (i.e., a positive effect on one mode of travel may adversely impact another)	• <i>(Yes/No/Not applicable/Text)</i>
• Some mitigation strategies (such as changes to signing/pavements markings and automated enforcement), may be suggested in the TIS, but can only be implemented by the jurisdiction					• <i>(Yes/No/Not applicable/Text)</i>	
Alternatives if No Reasonable Mitigation Strategies	• Impact fees	• <i>(Yes/No)</i>	• Impact fees	• <i>(Yes/No)</i>	• Can improvements for other parameters/topics be used for an offset?	• <i>(Yes/No/Not applicable/Text)</i>

Assessment of Parameter/Topic: Controlling Speeds (Continued)

	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Ease of Review by Jurisdiction (Easy, Moderate, Difficult)	<ul style="list-style-type: none"> Easy 	<ul style="list-style-type: none"> <i>(Agree/Disagree with Assessment)</i> 	<ul style="list-style-type: none"> Easy 	<ul style="list-style-type: none"> <i>(Agree/Disagree with Assessment)</i> 		<ul style="list-style-type: none"> <i>(Not applicable/Text)</i>
Likely Challenges	<ul style="list-style-type: none"> Other than compliance with design standards, this performance metric requires before/after studies 	<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 		<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 		<ul style="list-style-type: none"> <i>(Not applicable/Text)</i>
	<ul style="list-style-type: none"> For before/after studies, would need to identify conditions and durations for data collection (peak/off-peak, 24-hour, free-flow/congested, etc.) 	<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 				

From a technical analysis perspective, can this parameter generally be accommodated within existing TIS frameworks?

Yes: **X** No:

Jurisdiction Staff Recommendation for Including This Parameter/Topic:

Yes:	<input checked="" type="checkbox"/>
No:	<input type="checkbox"/>

Jurisdiction Staff Discussion of Recommendation:

Jurisdiction Staff Recommendation for Measurement Type:

Qualitative Measurement:	<input type="checkbox"/>
Quantitative Measurement:	<input type="checkbox"/>
Both:	<input type="checkbox"/>
Not Applicable:	<input type="checkbox"/>

Assessment of Parameter/Topic: De-Prioritizing Vehicular Throughput

Analyst:	Date:	Project:
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	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Performance Metric(s)	• Level of Service (LOS)	• (Yes/No)	• Extent to which the project implements the member jurisdiction’s Complete Streets policies	• (Yes/No)	• Considering LOS may be counter-intuitive; worsening LOS would decrease throughput, but increase congestion	• (Yes/No/Not applicable/Text)
	• Traffic volumes	• (Yes/No)			• May not be applicable in more rural areas; would require evaluation on a case-by-case basis	• (Yes/No/Not applicable/Text)
	• Theoretical roadway capacity	• (Yes/No)			• Measures of traffic performance other than LOS, such as delay and queuing, could be considered	• (Yes/No/Not applicable/Text)
	• Design speed of new roadways	• (Yes/No)				
Means of Assessment	• Before/after studies	• (Yes/No)	• Written Statement of Compatibility with performance metric described above	• (Yes/No)		• (Not applicable/Text)
	• Highway Capacity Manual (HCM)	• (Yes/No)				
	• Traffic volume forecasts	• (Yes/No)				
	• Roadway capacity reduction	• (Yes/No)				
Threshold of Acceptability	• Decrease in performance metrics	• (Yes/No)	• Full compatibility	• (Yes/No)	• Other thresholds could be considered	• (Yes/No/Not applicable/Text)
	• Compliance with design standards for new roadways	• (Yes/No)			• Variable thresholds could be considered based on area type (urban/suburban/rural)	• (Yes/No/Not applicable/Text)
Data Availability / Expense	• Standard traffic data collection	• (Yes/No)	• Not applicable	• (Not applicable)		• (Not applicable/Text)
	• Regional travel demand model	• (Yes/No)				
Ease / Standardization of Analysis	• Straightforward	• (Agree/Disagree with Assessment)	• Straightforward	• (Agree/Disagree with Assessment)		• (Not applicable/Text)
Availability of Reasonable Mitigation Strategies	• Geometric improvements	• (Yes/No)	• Geometric improvements	• (Yes/No)	• TDM features may discourage vehicle trips	• (Yes/No/Not applicable/Text)
	• Operational improvements (including signing/pavement markings and lighting)	• (Yes/No)	• Operational improvements (including signing/pavement markings and lighting)	• (Yes/No)	• Physical/operational improvements may not always be possible, or cost effective	• (Yes/No/Not applicable/Text)
			• Transportation Management Plan (TMP) along with Transportation Demand Management (TDM) strategies	• (Yes/No)	• Some mitigation strategies (such as changes to signing/pavements markings and automated enforcement), may be suggested in the TIS, but can only be implemented by the jurisdiction	• (Yes/No/Not applicable/Text)
Alternatives if No Reasonable Mitigation Strategies	• Impact fees	• (Yes/No)	• Impact fees	• (Yes/No)	• Can improvements for other parameters/topics be used for an offset?	• (Yes/No/Not applicable/Text)

Assessment of Parameter/Topic: De-Prioritizing Vehicular Throughput (Continued)

	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Ease of Review by Jurisdiction (Easy, Moderate, Difficult)	<ul style="list-style-type: none"> Easy 	<ul style="list-style-type: none"> (Agree/Disagree with Assessment) 	<ul style="list-style-type: none"> Easy 	<ul style="list-style-type: none"> (Agree/Disagree with Assessment) 		<ul style="list-style-type: none"> (Not applicable/Text)
Likely Challenges		<ul style="list-style-type: none"> (Insert any other specific challenges) 		<ul style="list-style-type: none"> (Insert any other specific challenges) 	<ul style="list-style-type: none"> If vehicles are discouraged from using one roadway, another roadway may need to accommodate those vehicles 	<ul style="list-style-type: none"> (Yes/No/Not applicable/Text)
					<ul style="list-style-type: none"> It may be advisable to consider this topic/parameter in conjunction with other topics/parameters 	<ul style="list-style-type: none"> (Yes/No/Not applicable/Text)

From a technical analysis perspective, can this parameter generally be accommodated within existing TIS frameworks?
 Yes: No:

Jurisdiction Staff Recommendation for Including This Parameter/Topic:

Yes:	<input type="checkbox"/>
No:	<input type="checkbox"/>

Jurisdiction Staff Discussion of Recommendation:

Jurisdiction Staff Recommendation for Measurement Type:

Qualitative Measurement:	<input type="checkbox"/>
Quantitative Measurement:	<input type="checkbox"/>
Both:	<input type="checkbox"/>
Not Applicable:	<input type="checkbox"/>

Assessment of Parameter/Topic: Multi-Modal Analyses

Analyst:	Date:	Project:
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	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Performance Metric(s)	<ul style="list-style-type: none"> • Vehicles <ul style="list-style-type: none"> ○ Level of Service (LOS) ○ Travel time reliability 	<ul style="list-style-type: none"> • (Yes/No) <ul style="list-style-type: none"> ○ (Yes/No) ○ (Yes/No) 	<ul style="list-style-type: none"> • Vehicles <ul style="list-style-type: none"> ○ Extent to which the project implements the member jurisdiction’s Complete Streets policies ○ Compliance with relevant master or comprehensive plans, including bicycle, pedestrian, and trail accommodations 	<ul style="list-style-type: none"> • (Yes/No) <ul style="list-style-type: none"> ○ (Yes/No) ○ (Yes/No) 	<ul style="list-style-type: none"> • Current quantitative performance metrics available for roadway vehicles, transit, bicycles and pedestrians must be assessed on a mode-by-mode basis, which complicates the analysis 	<ul style="list-style-type: none"> • (Yes/No/Not applicable/Text)
	<ul style="list-style-type: none"> • Transit <ul style="list-style-type: none"> ○ Travel speed (Highway Capacity Manual, Sixth Edition – HCM6) ○ Transit LOS score (HCM6) 	<ul style="list-style-type: none"> • (Yes/No) <ul style="list-style-type: none"> ○ (Yes/No) ○ (Yes/No) 	<ul style="list-style-type: none"> • Transit <ul style="list-style-type: none"> ○ Presence/absence of transit amenities (such as shelters) 	<ul style="list-style-type: none"> • (Yes/No) <ul style="list-style-type: none"> ○ (Yes/No) 	<ul style="list-style-type: none"> • Measures of traffic performance other than LOS, such as delay and queuing, could be considered 	<ul style="list-style-type: none"> • (Yes/No/Not applicable/Text)
	<ul style="list-style-type: none"> • Pedestrian <ul style="list-style-type: none"> ○ Pedestrian travel speed (HCM6) ○ Pedestrian space (HCM6) ○ Pedestrian LOS (HCM6) ○ Pedestrian delay ○ Pedestrian Level of Comfort (PLOC) 	<ul style="list-style-type: none"> • (Yes/No) <ul style="list-style-type: none"> ○ (Yes/No) ○ (Yes/No) ○ (Yes/No) ○ (Yes/No) 	<ul style="list-style-type: none"> • Pedestrian <ul style="list-style-type: none"> ○ ADA compliance for intersection ramps, sidewalk widths, etc. ○ Presence/absence of street lighting, countdown pedestrian signals, crosswalks, etc. 	<ul style="list-style-type: none"> • (Yes/No) <ul style="list-style-type: none"> ○ (Yes/No) ○ (Yes/No) 	<ul style="list-style-type: none"> • A mix of quantitative and qualitative performance metrics, by mode, might be worth considering 	<ul style="list-style-type: none"> • (Yes/No/Not applicable/Text)
	<ul style="list-style-type: none"> • Bicycle <ul style="list-style-type: none"> ○ Bicycle travel speed (HCM6) ○ Bicycle LOS (HCM6) ○ Level of Traffic Stress (LTS) 	<ul style="list-style-type: none"> • (Yes/No) <ul style="list-style-type: none"> ○ (Yes/No) ○ (Yes/No) 			<ul style="list-style-type: none"> • Some metrics may not be appropriate for all scenarios (i.e. it may not be necessary to assess micro-mobility in a rural environment) 	<ul style="list-style-type: none"> • (Yes/No/Not applicable/Text)
	<ul style="list-style-type: none"> • Micro-Mobility? 	<ul style="list-style-type: none"> • (Yes/No) 	<ul style="list-style-type: none"> • Micro-Mobility <ul style="list-style-type: none"> ○ Presence/absence of micro-mobility accommodations (such as scooter charging stations) 	<ul style="list-style-type: none"> • (Yes/No) <ul style="list-style-type: none"> ○ (Yes/No) 		

Assessment of Parameter/Topic: Multi-Modal Analyses (Continued)

	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Means of Assessment	• Before/after studies	• <i>(Yes/No)</i>	• Written Statement of Compatibility with Complete Streets policies and other area plans	• <i>(Yes/No)</i>	• HCM analysis can be accomplished by either Highway Capacity Software (HCS) or Synchro/SimTraffic	• <i>(Yes/No/Not applicable/Text)</i>
	• HCM	• <i>(Yes/No)</i>	<ul style="list-style-type: none"> • Documentation of PLOC and LTS • Documentation of other performance metric(s) described above 	<ul style="list-style-type: none"> • <i>(Yes/No)</i> • <i>(Yes/No)</i> 	• Require VISSIM for freeways and transit-specific analysis?	• <i>(Yes/No/Not applicable/Text)</i>
Threshold of Acceptability	• Improvement (or at least no worsening) in performance metrics	• <i>(Yes/No)</i>	• Full compatibility with Complete Streets policies	• <i>(Yes/No)</i>	• Improving a performance metric for one mode may lead to a decrease for other modes.	• <i>(Yes/No/Not applicable/Text)</i>
			• Acceptable levels of PLOC and LTS based on jurisdiction's standards/guidelines	• <i>(Yes/No)</i>	• Varying the threshold of acceptability for individual modes, depending upon the urban/suburban/rural setting, may be desirable	• <i>(Yes/No/Not applicable/Text)</i>
Data Availability / Expense	• Standard traffic data collection for vehicles	• <i>(Yes/No)</i>	• Not applicable	• <i>(Not applicable)</i>		• <i>(Not applicable/Text)</i>
	• Additional data collection for transit, pedestrian, bicycle, and micro-mobility	• <i>(Yes/No)</i>				
Ease / Standardization of Analysis	• Straightforward, but not commonly used for modes other than vehicles	• <i>(Agree/Disagree with Assessment)</i>	• Straightforward	• <i>(Agree/Disagree with Assessment)</i>	• A technique would need to be established regarding prioritization of modes/which mode "governs" in a certain situation, along with how much degradation will be tolerated in the non-governing mode(s)	• <i>(Yes/No/Not applicable/Text)</i>
	• Require use of HCS, Synchro, SimTraffic, and/or VISSIM?	• <i>(Yes/No)</i>				
Availability of Reasonable Mitigation Strategies	• Geometric improvements	• <i>(Yes/No)</i>	• Geometric improvements	• <i>(Yes/No)</i>	• Some mitigation strategies (such as changes to signing/pavements markings and automated enforcement), may be suggested in the TIS, but can only be implemented by the jurisdiction	• <i>(Yes/No/Not applicable/Text)</i>
	• Operational improvements (including signing/pavement markings and lighting)	• <i>(Yes/No)</i>	• Operational improvements (including signing/pavement markings and lighting)	• <i>(Yes/No)</i>		
Alternatives if No Reasonable Mitigation Strategies	• Impact fees	• <i>(Yes/No)</i>	• Impact fees	• <i>(Yes/No)</i>	• Can improvements for other parameters/topics be used for an offset?	• <i>(Yes/No/Not applicable/Text)</i>

Assessment of Parameter/Topic: Multi-Modal Analyses (Continued)

	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Ease of Review by Jurisdiction (Easy, Moderate, Difficult)	<ul style="list-style-type: none"> Moderate 	<ul style="list-style-type: none"> <i>(Agree/Disagree with Assessment)</i> 	<ul style="list-style-type: none"> Easy 	<ul style="list-style-type: none"> <i>(Agree/Disagree with Assessment)</i> 	<ul style="list-style-type: none"> Quantitative analyses could be challenging to review, particularly at outset of program 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>
Likely Challenges	<ul style="list-style-type: none"> Analysis of multiple modes requires additional effort 	<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 	<ul style="list-style-type: none"> Assessment is subjective for some performance metrics 	<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 	<ul style="list-style-type: none"> A physical or operational improvement that benefits one mode may actually work to the detriment of another mode 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>
					<ul style="list-style-type: none"> Some factors such as travel time reliability may be too detailed for TISs at this time and may not be understood by the public as well as LOS or delay 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>

From a technical analysis perspective, can this parameter generally be accommodated within existing TIS frameworks?

Yes: No:

Jurisdiction Staff Recommendation for Including This Parameter/Topic:

Yes:	<input type="checkbox"/>
No:	<input type="checkbox"/>

Jurisdiction Staff Discussion of Recommendation:

Jurisdiction Staff Recommendation for Measurement Type:

Qualitative Measurement:	<input type="checkbox"/>
Quantitative Measurement:	<input type="checkbox"/>
Both:	<input type="checkbox"/>
Not Applicable:	<input type="checkbox"/>

Assessment of Parameter/Topic: Multiple Proposed Developments

Analyst:	Date:	Project:
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	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Performance Metric(s)	<ul style="list-style-type: none"> All other proposed developments within X distance of subject development that have reached a certain level of approval. (Differing values of X desirable for urban vs. suburban vs. rural conditions) 	<ul style="list-style-type: none"> (Yes/No) 	<ul style="list-style-type: none"> All other proposed developments identified during Study Scoping Process 	<ul style="list-style-type: none"> (Yes/No) 	<ul style="list-style-type: none"> Needs to be firmly identified during the Study Scoping Process 	<ul style="list-style-type: none"> (Yes/No/Not applicable/Text)
	<ul style="list-style-type: none"> All other proposed developments with roadway access within TIS study area of subject development 	<ul style="list-style-type: none"> (Yes/No) 			<ul style="list-style-type: none"> If another proposed development does not require a TIS, perhaps incorporate that development via background growth rate 	<ul style="list-style-type: none"> (Yes/No/Not applicable/Text)
	<ul style="list-style-type: none"> All other proposed developments whose TIS study areas overlap the TIS study area of the subject development 	<ul style="list-style-type: none"> (Yes/No) 			<ul style="list-style-type: none"> If Quantitative Measurement is to be used, allow for flexibility, for unusual conditions 	<ul style="list-style-type: none"> (Yes/No/Not applicable/Text)
Means of Assessment	<ul style="list-style-type: none"> Number of other developments included 	<ul style="list-style-type: none"> (Yes/No) 	<ul style="list-style-type: none"> Number of other developments included 	<ul style="list-style-type: none"> (Yes/No) 		<ul style="list-style-type: none"> (Not applicable/Text)
Threshold of Acceptability	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> (Not applicable) 	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> (Not applicable) 		<ul style="list-style-type: none"> (Not applicable/Text)
Data Availability / Expense	<ul style="list-style-type: none"> Information readily available from jurisdiction's files 	<ul style="list-style-type: none"> (Yes/No) 	<ul style="list-style-type: none"> Information readily available from jurisdiction's files 	<ul style="list-style-type: none"> (Yes/No) 		<ul style="list-style-type: none"> (Not applicable/Text)
Ease / Standardization of Analysis	<ul style="list-style-type: none"> Standardization of identifying other developments is straightforward. 	<ul style="list-style-type: none"> (Agree/Disagree with Assessment) 	<ul style="list-style-type: none"> Will be based on jurisdiction's judgment. Strictly speaking, standardization of identifying other developments is not possible. 	<ul style="list-style-type: none"> (Agree/Disagree with Assessment) 		<ul style="list-style-type: none"> (Not applicable/Text)
	<ul style="list-style-type: none"> Analysis of other developments in TIS is straightforward 	<ul style="list-style-type: none"> (Agree/Disagree with Assessment) 	<ul style="list-style-type: none"> Analysis of other developments in TIS is straightforward 	<ul style="list-style-type: none"> (Agree/Disagree with Assessment) 		<ul style="list-style-type: none"> (Not applicable/Text)
Availability of Reasonable Mitigation Strategies	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> (Not applicable) 	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> (Not applicable) 		<ul style="list-style-type: none"> (Not applicable/Text)
Alternatives if No Reasonable Mitigation Strategies	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> (Not applicable) 	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> (Not applicable) 		<ul style="list-style-type: none"> (Not applicable/Text)
Ease of Review by Jurisdiction (Easy, Moderate, Difficult)	<ul style="list-style-type: none"> Moderate 	<ul style="list-style-type: none"> (Agree/Disagree with Assessment) 	<ul style="list-style-type: none"> Moderate 	<ul style="list-style-type: none"> (Agree/Disagree with Assessment) 		<ul style="list-style-type: none"> (Not applicable/Text)

Assessment of Parameter/Topic: Multiple Proposed Developments (Continued)

	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Likely Challenges	<ul style="list-style-type: none"> Unusual roadway network/access conditions may lead to unreasonable requirements 	<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 	<ul style="list-style-type: none"> May result in appearance of inequitable treatment of different developments 	<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 	<ul style="list-style-type: none"> Adjacent developments not within the same jurisdiction may be challenging 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>

From a technical analysis perspective, can this parameter generally be accommodated within existing TIS frameworks?

Yes: No:

Jurisdiction Staff Recommendation for Including This Parameter/Topic:

Yes:	<input type="checkbox"/>
No:	<input type="checkbox"/>

Jurisdiction Staff Discussion of Recommendation:

Jurisdiction Staff Recommendation for Measurement Type:

Qualitative Measurement:	<input type="checkbox"/>
Quantitative Measurement:	<input type="checkbox"/>
Both:	<input type="checkbox"/>
Not Applicable:	<input type="checkbox"/>

Assessment of Parameter/Topic: Balancing Housing/Business/Traffic

Analyst:	Date:	Project:
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	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Performance Metric(s)	<ul style="list-style-type: none"> Reduced vehicular trip generation 	<ul style="list-style-type: none"> <i>(Yes/No)</i> 	<ul style="list-style-type: none"> Provision/participation in program(s) to discourage vehicular trip generation 	<ul style="list-style-type: none"> <i>(Yes/No)</i> 	<ul style="list-style-type: none"> Actual changes in trip generation could only be assessed in a Post-Development Audit 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>
	<ul style="list-style-type: none"> Increased transit, micro-mobility, bicycle and/ or pedestrian trip generation 	<ul style="list-style-type: none"> <i>(Yes/No)</i> 			<ul style="list-style-type: none"> Consider allowing more vehicular congestion to encourage use of other modes 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>
	<ul style="list-style-type: none"> Provision of infrastructure to discourage vehicular trip generation 	<ul style="list-style-type: none"> <i>(Yes/No)</i> 				
Means of Assessment	<ul style="list-style-type: none"> Post-Development Audit 	<ul style="list-style-type: none"> <i>(Yes/No)</i> 	<ul style="list-style-type: none"> Financial commitment for program(s) to discourage vehicular trip generation 	<ul style="list-style-type: none"> <i>(Yes/No)</i> 		<ul style="list-style-type: none"> <i>(Not applicable/Text)</i>
	<ul style="list-style-type: none"> Design plans for infrastructure 	<ul style="list-style-type: none"> <i>(Yes/No)</i> 				
Threshold of Acceptability	<ul style="list-style-type: none"> Reduced vehicular trip generation 	<ul style="list-style-type: none"> <i>(Yes/No)</i> 	<ul style="list-style-type: none"> Financial commitment 	<ul style="list-style-type: none"> <i>(Yes/No)</i> 	<ul style="list-style-type: none"> Actual changes in trip generation could only be assessed in a Post-Development Audit 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>
	<ul style="list-style-type: none"> Additional infrastructure 	<ul style="list-style-type: none"> <i>(Yes/No)</i> 			<ul style="list-style-type: none"> How much infrastructure/financial commitment would be “acceptable”? 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>
Data Availability / Expense	<ul style="list-style-type: none"> Readily available for compliance with infrastructure design standards 	<ul style="list-style-type: none"> <i>(Agree/Disagree with Assessment)</i> 	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> <i>(Not applicable)</i> 		<ul style="list-style-type: none"> <i>(Not applicable/Text)</i>
	<ul style="list-style-type: none"> Dependent upon criteria for Post-Development Audit, for changes in trip generation 	<ul style="list-style-type: none"> <i>(Agree/Disagree with Assessment)</i> 				
Ease / Standardization of Analysis	<ul style="list-style-type: none"> Straightforward, for compliance with infrastructure design standards 	<ul style="list-style-type: none"> <i>(Agree/Disagree with Assessment)</i> 	<ul style="list-style-type: none"> Straightforward 	<ul style="list-style-type: none"> <i>(Agree/Disagree with Assessment)</i> 	<ul style="list-style-type: none"> Infrastructure/financial requirements would need to be developed. 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>
	<ul style="list-style-type: none"> Dependent upon procedures for Post-Development Audit, for changes in trip generation 	<ul style="list-style-type: none"> <i>(Agree/Disagree with Assessment)</i> 			<ul style="list-style-type: none"> Requirements would need to vary by location. (For example, provision of a sidewalk in a rural location, without connections to other sidewalks, may not be practical or even desirable. However, reservation of right-of-way for a future system of sidewalks could be appropriate.) 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>

Assessment of Parameter/Topic: Balancing Housing/Business/Traffic (Continued)

	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Availability of Reasonable Mitigation Strategies	• None, for compliance with infrastructure design standards	• <i>(Agree/Disagree with Assessment)</i>	• None	• <i>(Yes/No)</i>	• Incentives for mixed-use development could be considered, such as accepting reduced trip generation and internal trips	• <i>(Yes/No/Not applicable/Text)</i>
	• Dependent upon procedures for Post-Development Audit, for changes in trip generation	• <i>(Agree/Disagree with Assessment)</i>				
Alternatives if No Reasonable Mitigation Strategies	• Not applicable, for compliance with infrastructure design standards	• <i>(Agree/Disagree with Assessment)</i>	• Impact fees	• <i>(Yes/No)</i>		• <i>(Not applicable/Text)</i>
	• Dependent upon procedures for Post-Development Audit, for changes in trip generation	• <i>(Agree/Disagree with Assessment)</i>				
Ease of Review by Jurisdiction (Easy, Moderate, Difficult)	• Easy, for compliance with infrastructure design standards	• <i>(Agree/Disagree with Assessment)</i>	• Moderate	• <i>(Agree/Disagree with Assessment)</i>	• Likely to require qualitative judgment of “acceptable” in some cases	• <i>(Yes/No/Not applicable/Text)</i>
	• For changes in trip generation, dependent upon procedures for Post-Development Audit	• <i>(Agree/Disagree with Assessment)</i>				
Likely Challenges	• Dependent upon procedures for Post-Development Audit	• <i>(Insert any other specific challenges)</i>	• Development of standards	• <i>(Insert any other specific challenges)</i>		• <i>(Not applicable/Text)</i>
			• Consistency in application of standards	• <i>(Insert any other specific challenges)</i>		

From a technical analysis perspective, can this parameter generally be accommodated within existing TIS frameworks?

Yes: No: **X**

Jurisdiction Staff Recommendation for Including This Parameter/Topic:

Yes:	<input type="checkbox"/>
No:	<input checked="" type="checkbox"/>

Jurisdiction Staff Discussion of Recommendation:

Jurisdiction Staff Recommendation for Measurement Type:

Qualitative Measurement:	<input type="checkbox"/>
Quantitative Measurement:	<input type="checkbox"/>
Both:	<input type="checkbox"/>
Not Applicable:	<input type="checkbox"/>

Assessment of Parameter/Topic: Post-Development Audit

Analyst:	Date:	Project:
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	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Performance Metric(s)	• Net site trip generation by mode (proffered in selected horizon year)	• <i>(Yes/No)</i>	• Compliance with proffered TDM/mitigation measure(s)	• <i>(Yes/No)</i>	• Measures of traffic performance other than LOS, such as delay and queuing, could be considered	• <i>(Yes/No/Not applicable/Text)</i>
	• Trip distribution pattern	• <i>(Yes/No)</i>	• Compliance with Conditions of Approval	• <i>(Yes/No)</i>		
	• Levels of service	• <i>(Yes/No)</i>				
	• Traffic growth – study area roadway network	• <i>(Yes/No)</i>				
	• Proffered/required off-site improvements	• <i>(Yes/No)</i>				
Means of Assessment	• Various site trip generation and mode split surveys/driveway counts	• <i>(Yes/No)</i>	• Comparison of predicted versus actual operational situations	• <i>(Yes/No)</i>	• A mix of both quantitative and qualitative assessment may be useful	• <i>(Yes/No/Not applicable/Text)</i>
	• Intersection turning movement counts and capacity analysis	• <i>(Yes/No)</i>	• Evaluation of effectiveness of TDM/mitigation measures	• <i>(Yes/No)</i>		
	• Review of broad-base data reflecting growth trends, such as SHA AADT database	• <i>(Yes/No)</i>				
Threshold of Acceptability	• Established vehicle trip generation limits (“trip caps”)	• <i>(Yes/No)</i>	• Compliance with proposed TDM measures	• <i>(Yes/No)</i>	• A mix of both quantitative and qualitative assessment may be useful	• <i>(Yes/No/Not applicable/Text)</i>
	• Projected Levels of Service	• <i>(Yes/No)</i>	• Compliance with other Conditions of Approval	• <i>(Yes/No)</i>		
	• Projected trip distribution pattern	• <i>(Yes/No)</i>				
Data Availability / Expense	• Previously approved TIS document	• <i>(Yes/No)</i>	• Previously approved TIS and other supporting documents available from jurisdiction’s records	• <i>(Yes/No)</i>	• Ease of obtaining the data will be an important consideration (i.e., can the data be easily accessed online or through a time-consuming process?)	• <i>(Yes/No/Not applicable/Text)</i>
	• Archived traffic data (from MDOT SHA or jurisdiction)	• <i>(Yes/No)</i>				
	• New traffic count data	• <i>(Yes/No)</i>				
Ease / Standardization of Analysis	• Analysis procedure based on traffic engineering and transportation planning principles considered straightforward	• <i>(Agree/Disagree with Assessment)</i>	• Procedure for evaluating compliance is somewhat straightforward	• <i>(Agree/Disagree with Assessment)</i>		• <i>(Not applicable/Text)</i>
Availability of Reasonable Mitigation Strategies	• Not applicable	• <i>(Not applicable)</i>	• Not applicable	• <i>(Not applicable)</i>	• Post development audit can be considered as an “after the fact” type of evaluation. Therefore, this factor may not be applicable	• <i>(Yes/No/Not applicable/Text)</i>
Alternatives if No Reasonable Mitigation Strategies	• Not applicable	• <i>(Not applicable)</i>	• Not applicable	• <i>(Not applicable)</i>	• Post development audit can be considered as an “after the fact” type of evaluation. Therefore, this factor may not be applicable	• <i>(Yes/No/Not applicable/Text)</i>

Assessment of Parameter/Topic: Post-Development Audit (Continued)

	Quantitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Qualitative Measurement	Jurisdiction Staff Assessment: Should this line item be incorporated into TISs?	Comments	Jurisdiction Staff Assessment of Comments Column
Ease of Review by Jurisdiction (Easy, Moderate, Difficult)	<ul style="list-style-type: none"> Moderate 	<ul style="list-style-type: none"> <i>(Agree/Disagree with Assessment)</i> 	<ul style="list-style-type: none"> Easy 	<ul style="list-style-type: none"> <i>(Agree/Disagree with Assessment)</i> 	<ul style="list-style-type: none"> Review process involves a comparison of predicted vs. actual situations. (i.e., case of comparing apples with apples) 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>
Likely Challenges	<ul style="list-style-type: none"> Some of the metrics are difficult to quantify, considering that traffic volumes typically fluctuate daily 	<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 	<ul style="list-style-type: none"> Conditions stipulated in an accompanying resolution will have to be highly specific 	<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 	<ul style="list-style-type: none"> Would this be completed by the jurisdiction or the developer? (It would probably be the jurisdiction.) 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>
	<ul style="list-style-type: none"> Establishing a “degree of allowance/acceptability” with respect to analysis thresholds 	<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 	<ul style="list-style-type: none"> Potential need for revision of Adequacy of Public Facilities Ordinance 	<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 	<ul style="list-style-type: none"> Who would pay for the audit? (A developer “escrow” account could be used.) 	<ul style="list-style-type: none"> <i>(Yes/No/Not applicable/Text)</i>
	<ul style="list-style-type: none"> Potential for deterring private sector development/investment 	<ul style="list-style-type: none"> <i>(Insert any other specific challenges)</i> 			<ul style="list-style-type: none"> Will this be a requirement for all types of development, regardless of the location and size? 	<ul style="list-style-type: none"> Would this requirement be on a case-by-case basis?

From a technical analysis perspective, can this parameter generally be accommodated within existing TIS frameworks?

Yes: No: **X**

Jurisdiction Staff Recommendation for Including This Parameter/Topic:

Yes:	<input type="checkbox"/>
No:	<input checked="" type="checkbox"/>

Jurisdiction Staff Discussion of Recommendation:

Jurisdiction Staff Recommendation for Measurement Type:

Qualitative Measurement:	<input type="checkbox"/>
Quantitative Measurement:	<input type="checkbox"/>
Both:	<input type="checkbox"/>
Not Applicable:	<input type="checkbox"/>

For the parameter/topic of “Need for Different TIS Requirements”, the table-based approach was found to be not as meaningful as it was for the other parameters/topics. Thus, the template for this one parameter/topic includes narrative-based responses to a series of questions to guide whether it should be included in TIS procedures.

The text in italics below is copied verbatim from “Technical Memorandum No. 1: Assessment of Parameters/Topics”. It is repeated here to assist the individual performing the evaluation.

Assessment of Parameter/Topic: Variable Transportation Impact Study Requirements

Analyst:	Date:	Project:
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1. Is there a compelling reason to have variable TIS requirements?

A single type of TIS may fail to account for some desirable performance metrics in some, but not all situations. For example, consideration of parking management may be desirable in a dense urban setting, but may not be particularly relevant in a rural setting.

Jurisdiction Staff Discussion:

2. Does the master plan or other planning document(s) offer a straightforward method of establishing the different types of TIS to be identified?

If not, the type of TIS could perhaps be identified as part of the Study Scoping Process.

Jurisdiction Staff Discussion:

3. How many different types of TIS would be appropriate?

The larger the number of different types, the larger the number of types of review.

Jurisdiction Staff Discussion:

4. How would Performance Metrics, Means of Assessment and Thresholds of Acceptability vary by type of TIS?

For example, an LOS of "E" or even "F" might be acceptable in a dense urban setting, but not in a rural setting.

Jurisdiction Staff Discussion:

5. How would Data Availability/Expense, Ease/Standardization of Analysis, Availability of Reasonable Mitigation Strategies and Alternatives if No Reasonable Mitigation Strategies vary by type of TIS?

Inclusion of an additional Performance Metric would require consideration of each of these items as well.

Jurisdiction Staff Discussion:

6. How will Ease of Review by Jurisdiction be affected by variable types of TIS?

Strictly speaking, additional types of TIS will make the efforts of reviewers more complicated. However, the added complexity would not necessarily be extensive.

Jurisdiction Staff Discussion:

7. What are the Likely Challenges to implementing variable TIS requirements?

In addition to the items noted above, there could be resistance from TIS preparers regarding any additional complexity involved. Also, including variable TIS requirements could potentially require jurisdictions to change their Adequate Public Facilities Ordinances.

Jurisdiction Staff Discussion:

8. From a technical analysis perspective, can this parameter generally be accommodated within existing TIS frameworks?

Yes: No: **X**

Jurisdiction Staff Recommendation for Including Parameter/Topic:

Yes:	<input type="checkbox"/>
No:	<input checked="" type="checkbox"/>

Jurisdiction Staff Discussion of Recommendation:

V. Suggested Implementation Process

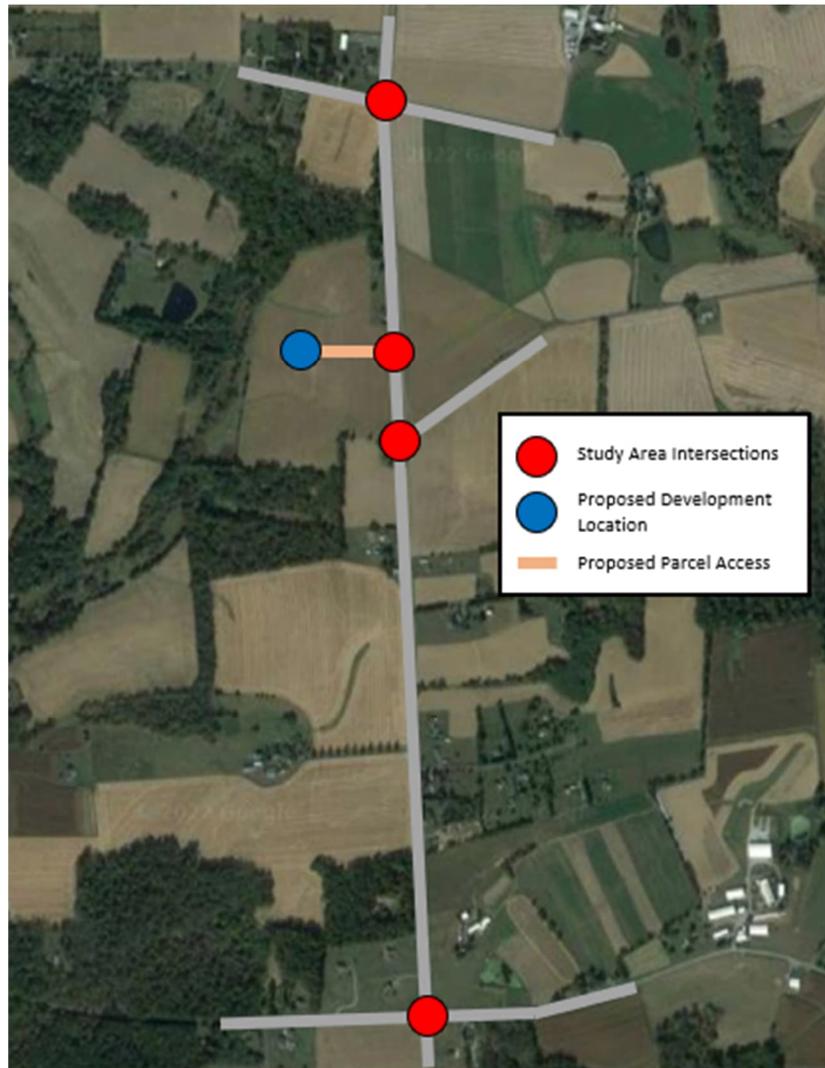
A. Case Study Scenarios

Once an individual or an agency has worked through the evaluation templates provided in Chapter 4, it would be desirable to apply the individual/agency recommendations for additional TIS requirements to at least one case study scenario, to determine how the recommendations actually “work” in a fictitious real-world setting. It would be preferable for a number of case study scenarios to be examined, so that a range of possible applications can be explored.

This section presents six such case study scenarios, with two case studies each representing rural, suburban, and urban settings. Of course, an individual/agency could develop additional case study scenarios, perhaps even applying the evaluation templates to a current TIS under review.

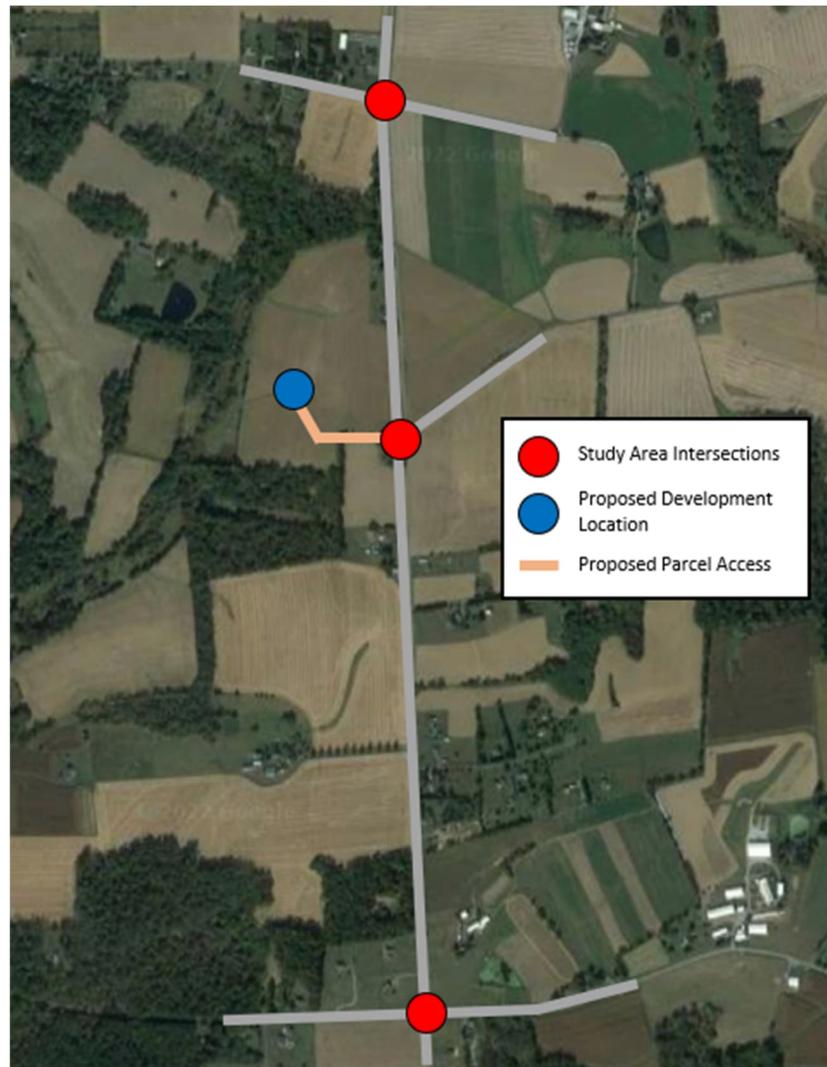
Case Study 1 (Rural)

1. Development Setting: Proposed development of 75 Single Family Detached Dwelling Units, planned for completion two years after approval of TIS.
2. Study Area Context: Study area and access point as defined (see below)
3. Background Development and Traffic Growth Considerations: No other nearby developments. Background growth rate supplied by jurisdiction.
4. Standard Base TIS Considerations: Turning movement count collection, trip generation, trip distribution, capacity analyses for existing, future no-build and future build conditions
5. Additional Considerations: Standard jurisdiction policies for access point design.



Case Study 2 (Rural)

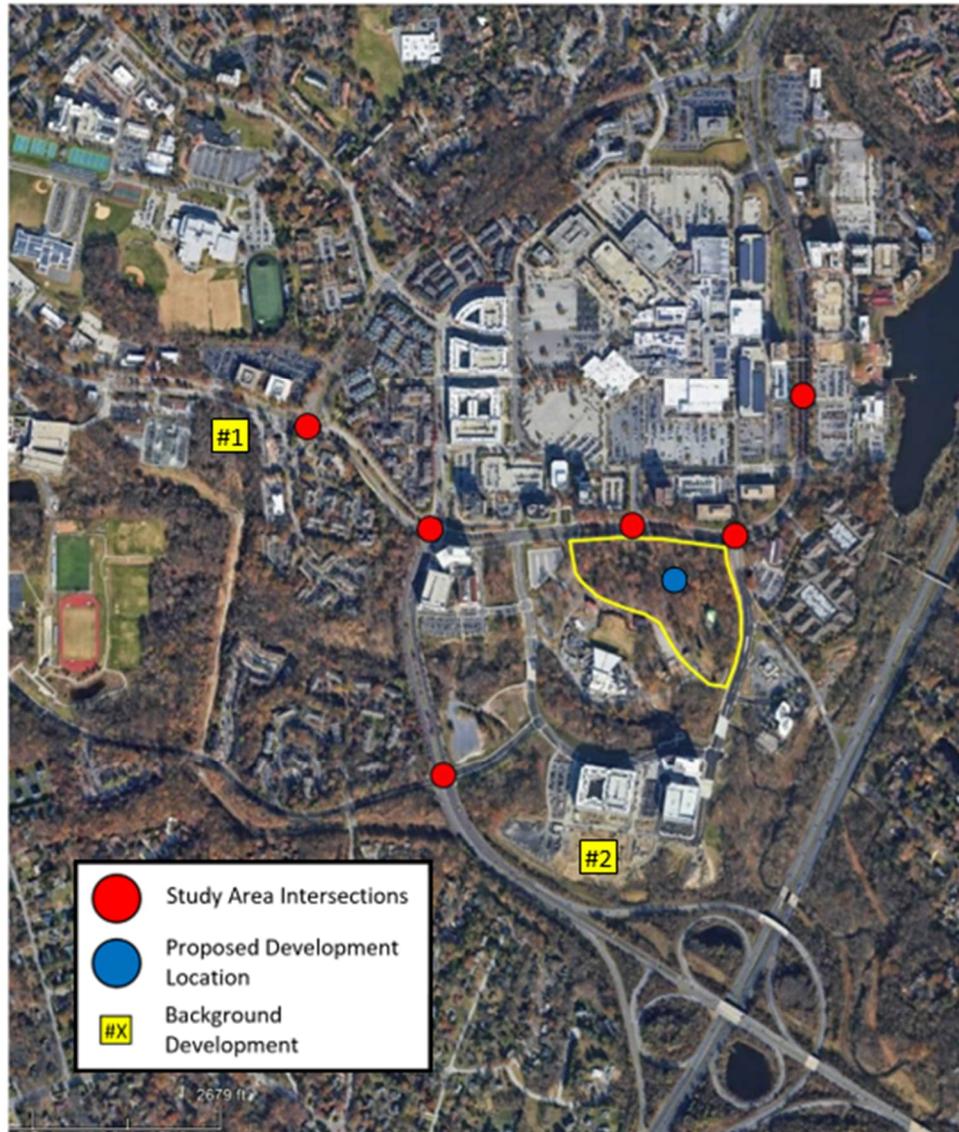
1. Development Setting: Proposed development of 75 Single Family Detached Dwelling Units, planned for completion two years after approval of TIS.
2. Study Area Context: Study area and access point as defined (see below)
3. Background Development and Traffic Growth Considerations: No other nearby developments. Background growth rate supplied by jurisdiction.
4. Standard Base TIS Considerations: Turning movement count collection, trip generation, trip distribution, capacity analyses for existing, future no-build and future build conditions
5. Additional Considerations: Standard jurisdiction policies for access point design.



Case Study 3 (Suburban)

1. **Development Setting:** Proposed development is mixed-use consisting of high-density residential, hotel, and local serving retail uses, served by approximately 1,500 surface parking spaces, including 20 electric vehicle charging stations. The subject development will be on a 16-acre property, which abuts a major regional shopping center. Primary site access will be via 3 new driveways, one which will connect to an existing signalized T-intersection. Developer anticipates completion in 4 -5 years.
2. **Study Area Context:** The site is located within a suburban Mixed-Use Town Center Zone, whose abutting roadways are served by bus/transit routes, as well as pedestrian and bicycle amenities. It is anticipated that the town center setting would allow for significant travel mode split, and perhaps internal trip capture. The site location map is shown below and highlights the study area intersections.
3. **Background Development and Traffic Growth Considerations:** Two background developments have been identified within the study area, and these are also highlighted on the site location map shown below. These background developments are proposed residential uses, generally in keeping with the Mixed-Use Town Center setting. Projected traffic growth to be agreed on with Jurisdiction.
4. **Standard Base TIS Considerations:** Vehicle turning movement counts, pedestrian and bicycle counts, evaluation of transit amenities, site trip generation (including trip credits), site trip distribution and assignment, capacity analyses for existing, background/no-build and future build conditions, as well as assessment of pedestrian, bicycle, and transit levels of service.

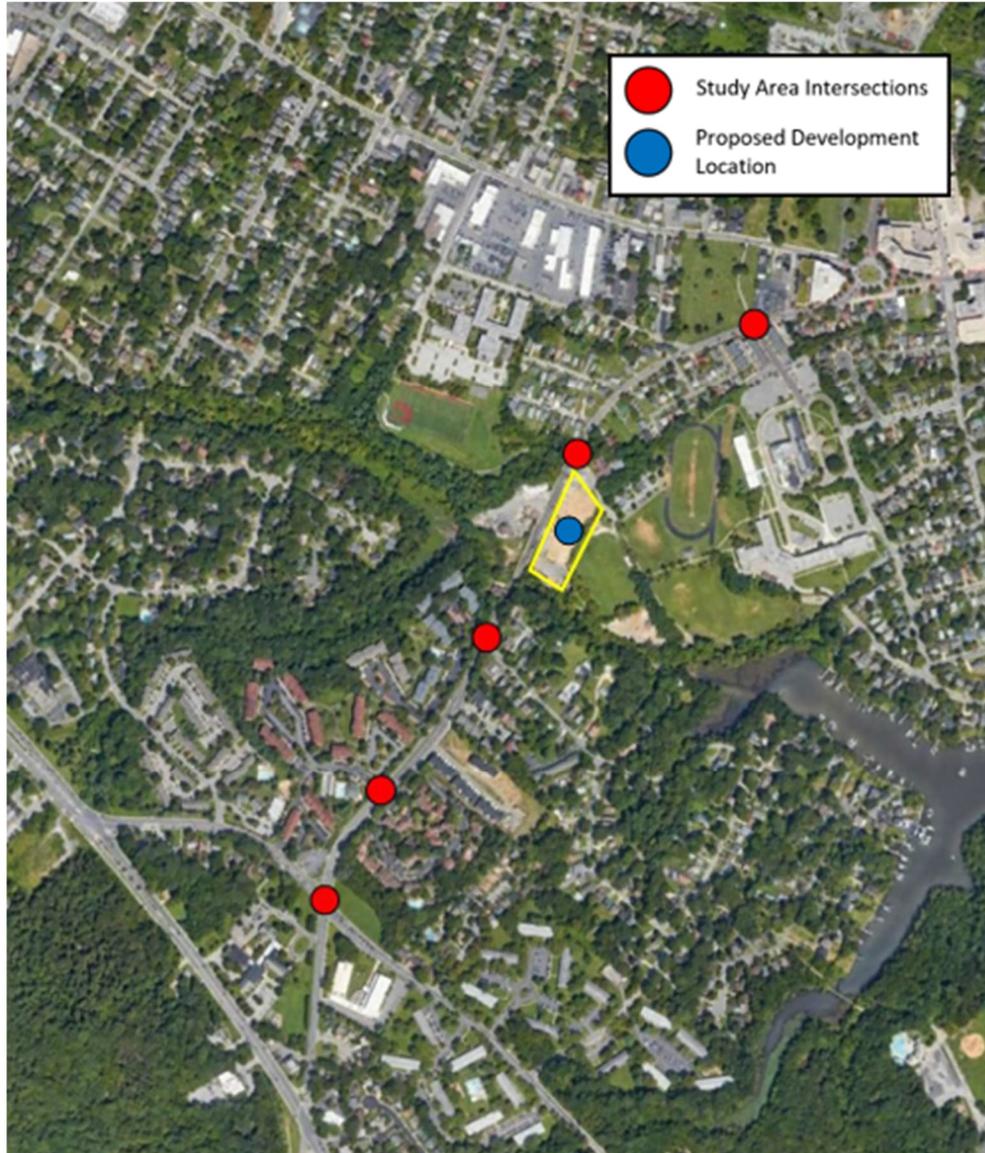
Case Study 3 (Suburban) (Continued)



Case Study 4 (Suburban)

1. Development Setting: Proposed development is being undertaken by a County Redevelopment Agency, and involves high-density residential, including 200 condominium units (1- to 2-bedroom), with ground floor retail, and live-work spaces. Primary site access will be via 2 new driveways, one which will connect to an existing stop-controlled T-intersection. Anticipated completion is within 4 -5 years.
2. Study Area Context: The site is located within a suburban Residential Zone, and abutting roadways are served by bus/transit routes, and pedestrian amenities. The site location map is shown below and highlights the study area intersections.
3. Background Development and Traffic Growth Considerations: There are no background developments within the study area; and a conservative traffic growth to be agreed on with Jurisdiction.
4. Standard Base TIS Considerations: Vehicle turning movement counts, pedestrian and bicycle counts, evaluation of transit amenities, site trip generation (including trip credits), site trip distribution and assignment, capacity analyses for existing, base/no-build and future build conditions.

Case Study 4 (Suburban) (Continued)



Case Study 5 (Urban)

1. **Development Setting:** Proposed development will combine three existing rowhomes into a small, three-story apartment complex (30 dwelling units), planned for completion under a year after approval of TIS
2. **Study Area Context:**
 - Study area as defined (see below)
 - One-way northbound traffic fronting development, one-way southbound traffic on parallel street (as noted on study area figure)
 - On-street parking currently in-place on both sides
 - 575' (0.1 miles) to nearest bus stop; existing bus routes on adjacent streets
3. **Background Development and Traffic Growth Considerations:** No other nearby developments. Background growth rate supplied by jurisdiction.
4. **Standard Base TIS Considerations:** Turning movement count collection, trip generation, trip distribution, capacity analyses for existing, future no-build and future build conditions

Case Study 5 (Urban) (Continued)

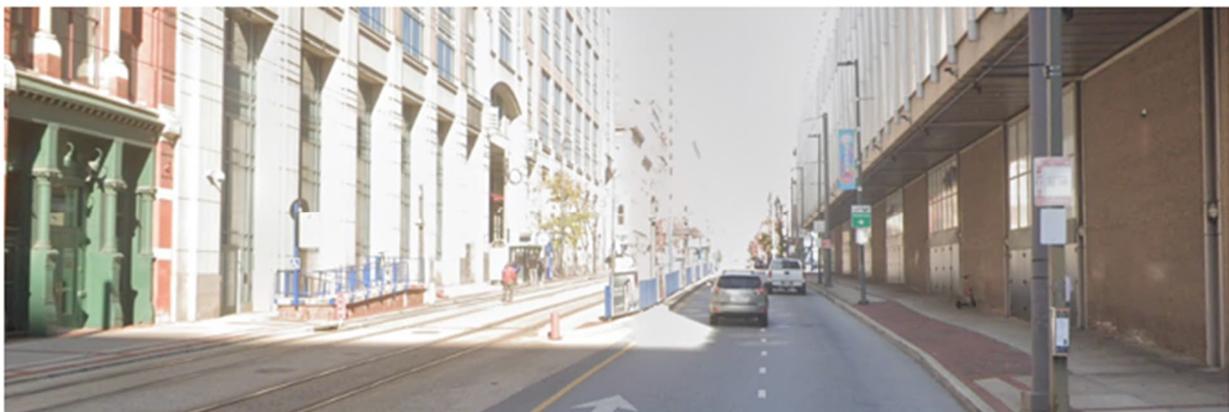
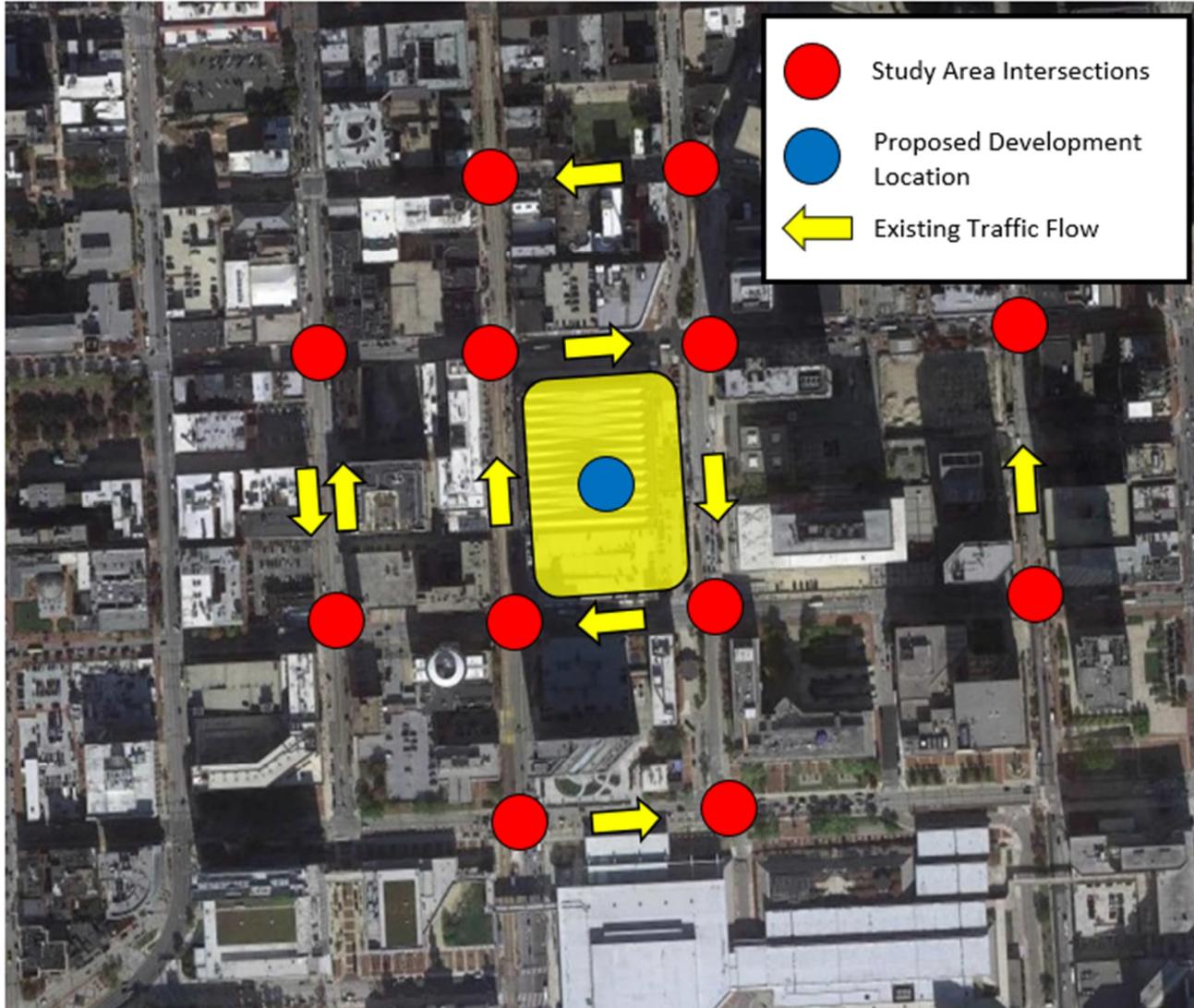


Case Study 6 (Urban)

NOTE: This is the existing Royal Farms Arena site in Baltimore City. For this case study exercise, assume that the arena does not currently exist and that an arena is currently proposed (as outlined below) to replace a surface parking lot at this location.

1. Development Setting: Proposed redevelopment of existing commercial development (approximate lot size of 4.75 acres) into new multi-purpose arena (approximate capacity of 15,000) and parking garage (approximately 1,000 spaces), planned for completion approximately 5 years after approval of TIS
2. Study Area Context:
 - Study area as defined (see below)
 - Large trip generator for weekend/weeknight activity during scheduled events
 - One-way traffic on surrounding streets (as noted on study area figure)
 - Existing parking garages located in the vicinity of the proposed development
 - Existing light rail tracks on west side of development with an existing stop serving the location
 - Existing bus routes and stops on adjacent streets
3. Background Development and Traffic Growth Considerations: No other nearby developments currently planned. Background growth rate supplied by jurisdiction.
4. Standard Base TIS Considerations: Vehicle turning movement counts, site trip generation, site trip distribution and assignment, capacity analyses for existing, background/no-build and future build conditions
5. Additional TIS Considerations: Pedestrian and bicycle counts, evaluation of transit amenities, assessment of pedestrian, bicycle and transit levels of service

Case Study 6 (Urban) (Continued)



B. Selection of Parameters/Topics

Once an individual/agency has worked through the number of case study scenarios felt to be appropriate, that individual/agency will have developed a recommendation regarding the potential inclusion – or non-inclusion – of each parameter/topic into the agency’s TIS Guidelines. That individual/agency will also have been able to identify the details for inclusion of the selected parameters/topics, in terms of quantitative versus qualitative assessment options for each of the following factors:

- Performance metric(s)
- Means of assessment
- Threshold of acceptability
- Data availability/expense
- Ease/standardization of analysis
- Availability of reasonable mitigation strategies
- Alternatives if no reasonable mitigation strategies
- Ease of review by jurisdiction
- Likely challenges

It is entirely possible that selecting the parameters/topics for inclusion will be an iterative process for an individual/agency, with modifications being made based on the case studies. It is also possible, however, that different case study scenarios may yield different results. For this reason, a blank summary table (**Table 2**) is provided below. Use of **Table 2** will allow an individual/agency to see which parameters/topics are most appropriate for the range of scenarios likely to be encountered by the agency.

Table 2: Jurisdiction Case Study Summary Table

Parameter/Topic		Include This Parameter/Topic, Based on This Case Study? (Yes/No)						Overall Jurisdiction Recommendations
		Rural		Suburban		Urban		
#	Description	1	2	3	4	5	6	
1	Safety Analyses							
2	Controlling Speeds							
3	De-Prioritizing Vehicular Throughput							
4	Multi-Modal Analyses							
5	Multiple Proposed Developments							
6	Balancing Housing/Business/Traffic							
7	Post-Development Audit							
8	Variable TIS Requirements							

Table 2 has been provided in Microsoft Word format, in an attachment to this Final Report, for use by the P2SC.

C. Revision of TIS Guidelines

Based upon the results obtained from completing the templates (Chapter 4), applying those templates to the Case Study Scenarios (Chapter 5A), and final selection of the parameters/topics to be included (Chapter 5B), detailed revisions to the agency's TIS Guidelines can then be undertaken.