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Access Management Curriculum for University Planning and Engineering Programs

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16. Abstract

Extensive research has been conducted on the topic of roadway access management and smart land use planning, documenting many benefits of these integrated practices to safety, congestion reduction, and livability. Consequently, many agencies across the US and abroad have instituted multidisciplinary and multimodal access management programs and projects. Yet few Universities educate planning and engineering students on the theory, practice, and benefits of access management. As a result, emerging professionals are entering practice with little or no knowledge of the topic and its critical importance to the transportation system. This project will fill that gap by providing a research-based curriculum with instructional resources and real-world applications that can be readily adapted into a variety of planning and engineering course offerings.

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I. About the Curriculum

The Access Management Curriculum is a joint project of the Center for Urban Transportation Research (CUTR) at the University of South Florida (USF) and the Texas A&M University Transportation Institute (TTI). It was produced under a grant from the National Institute for Congestion Reduction (NICR) at the University of South Florida, Center for Urban Transportation Research. The goal of the project is to develop a multidisciplinary curriculum on contemporary roadway access management and facilitate the integration of access management education into the core and elective curricula of university graduate programs in urban planning and engineering.

The anticipated outcome of the project is the adaptation of the materials into planning and engineering curricula of universities in the US and abroad, thereby resulting in professionals in transportation and related fields who are trained to effectively integrate roadway access management principles and practices into public and private sector plans, policies, programs, and projects. This project also advances the NICR mission to carry out education and workforce development activities to increase the capacity of the nation to optimize the transportation system for all users.

The curriculum advances these goals by directly addressing a key cause of congestion and crashes that is often overlooked by graduate programs—poorly designed and managed access to land development—thereby helping to resolve a major gap in the education of the future workforce. Although intended for university courses, the exercises and materials will also benefit transportation agencies and local governments seeking to train their workforce.

The modules in this guidance document address various multidisciplinary topics of particular importance to urban and regional planning and engineering with a targeted focus on access management. The modules are designed to be used in two ways: (1) plug-and-play, to supplement existing classes, and/or (2) as a full transportation course on access management. This guidance document was developed to support the instructor in delivering the course materials and can be used to develop the course syllabus.

Background

Extensive research has been conducted on the topic of roadway access management and smart growth planning, documenting the benefits of these integrated practices to safety, congestion reduction, and livability. In addition, there is a growing understanding of the need for context-sensitive plans and projects that serve all roadway users. Consequently, many agencies across the US and abroad have instituted multimodal plans with access management policies and strategies to advance vision zero, complete streets, and congestion management goals. The more recent emergence of equity as an important transportation priority has further elevated our understanding of the need to improve roadway safety and access to opportunity for underserved populations.

Despite its proven importance to the transportation system, few Universities educate planning and engineering students on the theory, practice, and benefits of roadway access management. As a result, emerging professionals are entering practice with little or no knowledge of the topic and its critical importance to the transportation system. This project fills that gap by providing a research-based curriculum with instructional resources and real-world applications that can be readily adapted into a variety of planning and engineering course offerings.

Methodology

Development of the curriculum began with the identification and review of key literature and guidance documents relevant to access management. These included manuals, research reports, training materials, and guidance documents available from the Transportation Research Board, National Cooperative Highway Research Program, Institute of Transportation Engineers, National Highway Institute, the Federal Highway Administration, and state transportation agencies. Selected syllabi and lecture materials from university transportation planning and engineering courses were also consulted. Finally, the project team relied on their extensive previous research and course materials on related topics such as land development and access, corridor planning, complete streets, public involvement, transportation engineering, roadway and site access design, state highway access management program administration, sustainable transportation, and multimodal transportation planning.

Elements of the curriculum structure include items such as the learning objectives, learning outcomes, competencies, evaluations/assessments, and related activities. These elements were modeled based on guidance from various pedagogical resources, including active learning techniques of university Centers for Teaching Excellence (or similar resources) and learning outcomes of the Planning Accreditation Board (PAB 2022) and the Accreditation Board for Engineering and Technology (ABET 2021).

Curriculum Structure

The curriculum is divided into nine modules that follow a standard outline. The outline includes a brief description of the module, applicability to various planning and engineering disciplines, subtopics addressed, learning objectives, readings, and other resources (e.g., videos, fact sheets, tools), assignments and activities, learning outcomes, and suggestion evaluation methods. Learning outcome assessment rubrics and suggested student learning assessment questions aid in module evaluation.

The course modules may be used in one of two ways. Instructors may use some or all of a module for “plug-and-play” style lectures to add or enhance the content of existing courses. Alternatively, the modules may be adapted by the instructor to develop a full multidisciplinary course on access management. Because course sessions may vary in length, the modules and supporting lecture materials may need to be divided into sections to accommodate sessions of different lengths.

Although the modules focus on access management generally, given the multidisciplinary nature of roadway access management, they include material applicable to a variety of subjects. These include courses on land use planning, safety, transportation governance, geometric design, traffic engineering, transportation planning, complete streets, sustainable transportation, transportation and land use law, and public involvement. As such, instructors will find materials of benefit to a variety of course types and learning objectives.

The nine modules are:

1. Introduction to Roadway Access Management
2. Effects of Access Management
3. Land Development and Access
4. Access Location and Spacing
5. Access Design
6. Access Management Policy and Process
7. Corridor Access Management Plans

8. Legal Considerations in Access Management
9. Public Involvement in Access Management

Each module outline is accompanied by suggested in-class activities, such as interactive discussions or tool applications, as well as PowerPoint slides with lecture notes that address the suggested content. Notes in italics provide information or suggestions for the instructor. The module outlines, activities, and assignments are provided in this guidance document, whereas the PowerPoint slides are provided as separate downloadable files. Assignments related to the modules are suggested in each module outline, although some may be done over the course of several class sessions or throughout a given semester. For example, an assignment to develop a corridor plan with complete streets concepts and access management components is provided as a semester-long project involving student teams. Another assignment involving Technique Reports would involve short individual student presentations over several sessions intermingled with the lecture for that session.

Learning Outcomes and Relevant Core Competencies

Each module has specific learning objectives relevant to the topic(s) addressed in the module. Generally, the curriculum will enable students to:

- Understand the concept of access management and its importance to the safety and operation of the multimodal transportation system, as well as related concepts of access, mobility, and accessibility.
- Identify and/or measure the effects of access management on transportation safety, operations, livability, equity, and the economy in different contexts.
- Communicate how lack of access management contributes to congestion, crashes, and other adverse conditions and advocate for appropriate programs, policies, and practices to address these conditions in a proactive and legally defensible manner.
- Recognize various planning, policy, physical design, and administrative techniques for managing multimodal access in a transportation network and corridor planning context.
- Apply what they have learned to different situations and scenarios so that they are equipped to develop an access management plan that incorporates smart land use and complete streets design.

The Accreditation Board for Engineering and Technology (ABET) accredits university programs in engineering and other natural and applied science disciplines and sets forth criteria to ensure that students receive the proper education in the form of skills, knowledge, and behaviors or values to enter the professional practice of engineering. The ABET general criteria for student outcomes are numerically cross-referenced in the learning outcomes and evaluation section for each module and are reproduced in Table 1. *Note: ABET conducts a regular review of the accreditation criteria and may propose changes to one or more criteria. Please see the ABET website for the latest accreditation criteria.*

Table 1. ABET General Criterion 3: Student Outcomes (Engineering)

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Source: Criteria for Accrediting Engineering Programs, 2022 – 2023 (ABET 2021).

Guidelines of the Planning Accreditation Board (PAB), an organization that accredits university programs in urban and regional planning, were also consulted for the curriculum. PAB applies an overarching process to ensure that programs adequately prepare to become planning practitioners. It leaves the development of learning outcomes and assessment to the program or department but requires "a clearly defined approach, methodology, and indicators for student learning outcomes and competencies for the expected knowledge, skills, and guiding values that students are expected to acquire" (PAB 2022). The specific knowledge, skills, and values are shown in Table 2 and are referenced in the learning outcomes and evaluation section for each module. *Note: PAB conducts regular reviews of the accreditation criteria and may propose changes to one or more criteria. Please see the PAB website for the latest accreditation criteria.*

Table 2. PAB Student Knowledge Skills and Values (Planning)

Knowledge and Skills	1) **General Planning Knowledge in Global Context:** The comprehension, representation, and use of ideas and information in the planning field, in the U.S. (or Canada) and internationally including appropriate perspectives from history, social sciences, design, and other allied fields.
Knowledge and Skills	2**) Skills and Tools for Planning Practice**: The use and application of knowledge to perform tasks required in the practice of planning.
Values	3) **Equity, Diversity, Social Justice, and Inclusion**: key issues of equity, diversity, and social justice, including planners' role in expanding choice and opportunity for all persons; planning for the needs of disadvantaged groups; reducing inequalities through critical examination of past and current systems; and promoting racial and economic equity.
Values	4) **Sustainability, Resilience, and Climate Justice**: environmental, economic, and social/political factors that contribute to sustainable communities, reducing impacts of climate changes, and creating equitable and climate-adaptive futures.
Values	5) **Professional Ethics and Responsibility**: key issues of planning ethics and related questions of the ethics of public decision-making, research, and client representation.

Source: Planning Accreditation Board, 2022 (PAB 2022)

The anticipated learning outcomes and core competencies are specified in the learning outcomes and evaluation table for each module outline. They further include a brief description of suggested instructional methods and an assessment method to measure student progress in achieving the learning outcomes. This curriculum uses suggested numeric references to the ABET criteria in Table 1, as well as knowledge, skills, and values in PAB, as noted in Table 2, to define the core competencies. In some disciplines and within certain teaching models, values may also be referred to as attitudes, behaviors, or abilities. Table 3 summarizes the modules, learning outcomes, and relevant core competencies.

Table 3. Modules and Learning Outcomes

Modules and Learning Objectives	Knowledge	Skills	Values	ABET
Module 1: Introduction to Roadway Access Management				
Define roadway access management	X			3,7
Explain the distinction between access, accessibility, and mobility	X			3,4,7
Describe the theory behind roadway access management and how the practice has evolved	X			3,4,7
Identify methods used to implement access management	X	X		1,4,7
Module 2: Effects of Access Management				
Explain the benefits of access management to transportation systems, urban form, and the economy	X		X	3,4
Describe how equity, sustainability, and resilience are impacted when access is not properly managed	X		X	3,4
Apply basic methods to evaluate the impacts of access management techniques	X	X		1,3,4,6
Module 3: Land Development and Access				
Explain the land use and transportation cycle and why it is counterproductive	X		X	3,4
Describe how land division and subdivision activity impacts access design	X		X	3,4,6
List methods to manage access in the land development process	X	X		3,7
Module 4: Access Location and Spacing				
Describe the difference between the upstream and downstream functional area.	X			3,7
Explain the different concepts that may be used to determine access spacing	X			3,7
Calculate upstream and downstream functional intersection area	X	X		1,6
Module 5: Access Design				
Describe the concept of functional circulation	X			3,7
Explain how roadway design elements influence through movement and corridor safety	X		X	3,4,7
Calculate the safety effects of various design elements	X	X		1,4,6

Table 4. Modules and Learning Outcomes, continued

Modules and Learning Objectives	Knowledge	Skills	Values	ABET
Module 6: Access Management Policy and Process				
List the components of systemwide access management regulations	X			7
Explain the driveway permitting process	X			3,7
Evaluate the adequacy of state and local access management policies	X	X	X	4,6
Module 7: Corridor Access Management Plans				
Analyze existing corridor conditions and context	X	X	X	4,6
Develop corridor access management and complete streets concepts	X	X		1,2,3,4,7
Explain how to implement a corridor access management plan	X			3,7
Module 8: Legal Considerations in Access Management				
Describe the difference between police power and eminent domain	X		X	3,7
Summarize important legal considerations related to the application of access management	X	X	X	3,4
Explain how a regulatory process can impact the legal viability of an access management program	X		X	3,4
Module 9: Public Involvement in Access Management				
Explain the do's and don'ts of effective public involvement	X		X	3,4
Choose an appropriate level of public outreach for a specific project or decision	X	X	X	3,4,6
Identify appropriate involvement techniques	X	X	X	3,4
Apply communication strategies to address common stakeholder concerns	X	X	X	3,4

II. Modules

Module 1: Introduction to Roadway Access Management

This module introduces students to roadway access management. It covers important concepts and definitions, the theory and principles behind access management, and how the field has evolved in response to changes in planning and engineering practice. It also exposes students to a variety of access management techniques.

Applicability

Transportation history, land use planning, transportation planning, transportation systems planning, transportation engineering, sustainable transportation, civil engineering, highway design.

Subtopics

- Definition of roadway access management
- Key concepts
    - Access, accessibility, and mobility
- History and theory
    - Emergence of access management (strip development and access problems)
    - Evolution of contemporary practice
    - Importance of functional hierarchy (roadway/modal function, land use context, access, and street design)
- Access management techniques

Learning Objectives

At the end of this module, students will be able to:

- Define roadway access management and its goals
- Explain the distinction between access, accessibility, and mobility
- Describe the theory behind roadway access management and how the practice has evolved
- Identify methods used to implement access management

Readings

Use the list of suggested resources to identify one or more required and/or optional readings for this module.

Debow, C. and Drow, M. (2019). Curbside management: Managing access to a valuable resource. International Parking & Mobility Institute. https://www.parking-mobility.org/2019/05/06/curbside-management-managing-access-to-a-valuable-resource/#:~:text=Curbside%20management%20is%20the%20collection,and%20other%20high%2D%20demand%20areas.

Demosthenes, P.(1999). Access management policies: An historical perspective. *Proceedings of the International Right of Way Association Conference*. http://www.teachamerica.com/accessmanagement.info/pdf/History_of_AM.pdf

Dixon, K., R. Layton, M. Butorac, P. Ryus, J.L. Gattis, L. Brown, and D. Huntington. (2016). Access management application guidelines. Transportation Research Board of the National Academies, Washington, D.C. (Chapter 1: When and Where to Apply Access Management Techniques; Chapter 2: Roadway Functional Classification; Chapter 25: Systemwide Access Management Considerations)

Institute of Transportation Engineers. (n.d.) Curbside management practitioners guide. https://www.ite.org/pub/?id=C75A6B8B-E210-5EB3-F4A6-A2FDDA8AE4AA

Netherton, R.D., Cribbet, J. (1964) Control of highway access. 4 *Natural Resources Journal*. 205. https://digitalrepository.unm.edu/nrj/vol4/iss1/18

Nichols, C.M. and Dorsett, J. (2022). Create a curb-management framework in 7 steps. American Planning Association: Planning Magazine. https://www.planning.org/planning/2022/winter/create-a-curb-management-framework-in-7-steps/

Sokolow, G., Williams, K., and Levinson, H.S. (2014). The changing focus of access management. *Proceedings of the Second TRB International Conference on Access Management, ASCE Compendium,* Shanghai, China.

TRB Access Management Committee Strategic Plan (contact the Committee Chair of the TRB Standing Committee on Access Management (ACP60) at https://www.mytrb.org/OnlineDirectory/TRBList/Index?searchText=Committee+Chairs).

Williams, K. and Levinson, H. (2008). Access management past, present and future. *Proceedings of the 8th National Access Management Conference*, Baltimore, MD.

Williams, K. and Levinson, H. (2011). The role of access management in sustainable development. *Proceedings of the First T&DI Congress, ASCE*, Chicago, Illinois.

Williams, K. and Levinson, H. (January 2010). Access management: An overview. *ITE Journal*, pp. 24-28.

Williams, K., Stover, V.G. Dixon, K., Demosthenes, P., Broen, F., Brown, L., Huntington, D. Layton, R. and Seggerman, K. (2014). Access management manual, 2nd Edition. Transportation Research Board of the National Academies, Washington D.C. (Chapter 1: Introduction and Concepts; Chapter 4: Networks and Local Circulation)

Videos

The following videos may be useful in this and other modules.

International Parking & Mobility Institute (Robert Ferrin and Brandy Stanley). (2021). Curb management in the real world: Case studies and conversation. https://www.youtube.com/watch?v=jNqPEdkK-_k

Florida LTAP (Gary Sokolow and Kristine Williams). (2021). Access management – The basics and more. Part 1: The basis for access management; Part 2: Land development and access management techniques; Part 3: National access management research and resources. https://floridaltap.org/recorded-webinar-access-management-the-basics-and-more/

Ohio LTAP Center (Raymond Brushart). (2019). Getting safely from here to there - An access management overview. https://www.youtube.com/watch?v=NbuyIeLKxVU

Utah DOT. UDOT raised median tour 2018. https://www.udot.utah.gov/raisedmedians/Pages/ResourcePages/RaisedMedianVideo

NCDOT reduced conflict intersections in North Carolina https://www.ncdot.gov/initiatives-policies/Transportation/safety-mobility/reduced-conflict-intersections/Pages/default.aspx

Assignments and Activities

A. Homework Assignments:

a. Read and Reflect.

The purpose of this assignment is to give you a foundational understanding of the history and trends that have shaped access management.

Instructions: Read Demosthenes (1999) "Access Management Policies: An Historical Perspective," (http://www.teachamerica.com/accessmanagement.info/pdf/History_of_AM.pdf) and answer the following questions.

1. What historical trends led to the need for access management of the transportation system?
   Suggested answer: *Growth in auto use and attraction of commercial uses to highways, repelled residential uses with small lots, and lack of curb control*.
2. The author is critical of the lack of adequate access spacing requirements at the State level and notes that "management of access on non-fully controlled arterials was very weak…" Why, in his view, were state highway engineers not addressing access management in a more systematic way?
   Suggested answer: *Access management was not considered a design element like right-of-way and cross sections*.
3. What has been the primary criterion for access location in the US?
   Suggested answer: *Sight distance.*
4. Why is Schoppert's 1957 study of crashes on rural two-lane highways significant to our understanding of the need for access management?
   Suggested answer: *One of the earliest conclusions was that driver workload, caused by access frequency, was a major contributing factor to crash potential on highways.*
5. The author is highly critical of the driveway spacing standards commonly applied by the state transportation agencies in the US. What was the basis for these driveway spacing standards and why is he critical of them?
   Suggested answer: *1960 AASHTO "Guide for Preparing Private Driveway Regulations for Major Highways", which recommended one driveway for 50-foot frontages and no more than 2 for larger frontages. This led to 10 to 50-ft spacing standards. These regulations supported up to 210 driveways per mile, despite clear evidence of the relationship between access density and crashes*.
6. What did the State of Colorado do that is of historical importance to access management?
   Suggested answer: *Adopted the first systematic statewide access management statute and regulation*.

b. Technique Report:

The purpose of this assignment is to help you acquire in-depth knowledge about various access management techniques. You will use the information provided in your class session as well as additional resources to conduct your own research on access management.

Instructions: You will identify an access management technique and conduct research on the selected technique (your instructor may provide you with a list of techniques to choose from or you may be tasked with identifying techniques yourself). The technique may involve policy, design, and/or administration. Provide at least two specific examples of where the technique has been applied and discuss benefits as well as considerations in or challenges of technique application. Prepare a PowerPoint presentation on the technique and provide a short report (recommended 2-4 pages) to your instructor demonstrating your understanding of the technique and the sources of information used. Properly cite all of the sources used in the report.

Presentation: PowerPoint presentations should be of professional quality (no typos, clear images, etc.) and be no longer than 5-7 minutes with up to 5 minutes for Q&A. Emphasize the examples of applications that you identified in your research.

Report: Technique reports should follow this standard format: **technique** (name of technique), **description** (brief overview), **applications** (e.g., where applied), **examples** (e.g., short explanations of where it has been applied and any information on effects, include illustrations or images), **special considerations** (e.g., what should one know when attempting to apply this technique?), **advantages**, **disadvantages**, **conclusions**, **references**.

c. The Future of Access Management:

The purpose of this assignment is to help you understand how the practice of access management has evolved in parallel with historical events, public policy, and influences in planning and engineering practice. led to those changes? It encourages research into historical events, contemporary practice, and emerging issues and technology related to transportation that impact how transportation access is managed.

Instructions: Write a 500- to 700-word essay that connects how access management has changed through time to events or influences, as well as critiques, in planning practice that led to those changes and how you feel it may continue to evolve in the future in light of emerging issues and trends in the industry. All of the works cited in your essay must be from a credible source (e.g., websites ending in .gov, .org, .edu, peer-reviewed publications, and/or professional societies such as ASCE, ITE, and APA). Include authoritative references in APA style to support your claims. Consider basing your analysis on a news item, blog post, opinion piece, or webinar that relates to an access management topic.

Example resources for essays:

Demosthenes, P.(1999). Access management policies: An historical perspective. *Proceedings of the International Right of Way Association Conference*. http://www.teachamerica.com/accessmanagement.info/pdf/History_of_AM.pdf

Sokolow, G., Williams, K., and Levinson, H.S. (2014). "The Changing Focus of Access Management," *Proceedings of the Second TRB International Conference on Access Management, ASCE Compendium*, Shanghai, China.

TRB Access Management Committee Strategic Plan (contact the Committee Chair of the TRB Standing Committee on Access Management (ACP60) at https://www.mytrb.org/OnlineDirectory/TRBList/Index?searchText=Committee+Chairs.

Williams, K. and Levinson, H. (2008). "Access Management Past, Present and Future," *8th Proceedings of the National Access Management Conference*, Baltimore, MD

Williams, K. and Levinson, H. (2011). "The Role of Access Management in Sustainable Development," *Proceedings of the First T&DI Congress, ASCE*, Chicago Illinois.

B. Quiz Questions:

1. List and explain two key principles of access management.
2. What historical trends led to the need for access management of the transportation system?
3. Draw the basic access-mobility curve. Label the axes.

   (a) Show where the following roadway classifications fall along the curve: local street, collector, arterial.

   (b) What does the separate functions theory mean for access management?

   (c) Where would the break occur on the access-mobility curve (question b)?
4. What is speed differential and how is it affected by access management?
5. Short Essay: List the major roadway classifications. Explain the role of each classification in access management. Describe some of the challenges that arise from an incomplete network.

C. Example knowledge probe questions for in-class discussion (or quizzes)

1. What elements of the transportation network are we talking about when we say "access"?
2. Explain the distinction between access, accessibility, and mobility. How do these concepts relate to roadway functional hierarchy?
3. How does land use context and modal priority influence how we manage roadway access? For example, consider how roadway access is provided in urban core areas versus suburban arterial highways. How does parking fit in? How is pedestrian access handled?

Learning Outcomes and Evaluation

Module learning outcomes	Competencies	Suggested Tools	Learning outcomes achieved?*	Notes**
Students are able to define roadway access management and its goals.	☒Knowledge ☐Skills ☐Values ABET (3,7)	During class: Module 1 knowledge probe question #1 After Class: Muddiest point paper: Ask students to write down the most unclear point from the class session. Review responses and address points in the next lecture.	☐Yes ☐No	
Students are able to explain the distinction between access, accessibility, and mobility	☒Knowledge ☐Skills ☐Values ABET (3,4,7)	During Class: Module 1 knowledge probe questions #2 and #3.	☐Yes ☐No	
Students are able to describe access management theory and how the practice has evolved	☒Knowledge ☐Skills ☐Values ABET (3,4,7)	During Class: Module 1 quiz After Class: Module 1 homework a: Read and Reflect Module 1 homework b: Technique Report Module 1 homework c: The Future of Access Management	☐Yes ☐No	
Students are able to identify methods used to implement access management	☒Knowledge ☒Skills ☐Values ABET (1,4,7)	After Class: Module 1 homework b: Technique Report	☐Yes ☐No	

**If the learning outcome is not achieved, identify what additional steps are needed to achieve the learning outcome and improve student learning.*

***Identify the areas that are difficult for students and the areas in which students are excelling. Are there other observations?*

Learning Outcome Assessment Rubric

Learning Outcomes	Excellent	Good	Poor
Students are able to define roadway access management and its goals.	Displays a deep and nuanced understanding of roadway access management.	Displays an adequate understanding of roadway access management.	Conveys little understanding of roadway access management.
Students are able to explain the distinction between access, accessibility, and mobility	Demonstrates a full understanding of the distinction between access, accessibility, and mobility.	Demonstrates some understanding of the distinction between access, accessibility, and mobility.	Demonstrates little understanding of the distinction between access, accessibility, and mobility.
Students are able to describe access management theory and how the practice has evolved	Capable of clearly explaining theory and evolution of practice.	Capable of explaining some theory and changes in practice.	Cannot explain theory and/or changes in practice.
Students are able to identify methods used to implement access management	Capable of identifying most methods used to implement access management.	Capable of identifying some methods used to implement access management.	Not capable of identifying methods used to implement access management.

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Module Evaluation

Before Module

Please describe your familiarity with the following topics:

Definition of roadway access management and its goals.
- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

Distinction between access, accessibility, and mobility.
- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

The theory behind access management and how the practice has changed over time.
- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

Methods used to implement access management.
- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

After Module

Think about the topics discussed in this module and how familiar you were with the topics before class. Has your understanding of the topic improved?

Definition of roadway access management and its goals.
- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Distinction between access, accessibility, and mobility.
- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

The theory behind access management and how the practice has changed over time.
- ◯ No, it is the same. I know just as much as I knew before class.

- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Methods used to implement access management.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Notes

The Netherton text listed in the readings section of this guidebook is no longer available in print but may be available in some libraries or online. This text offers an excellent in-depth historical view of the early practice of access management and would be beneficial in class if accessible through your available resources.

Example knowledge probe questions adapted from the following resources:

U.S. Department of Transportation. (2017). NHI Course 133078, Access Management: Solutions for All Users, Participant Workbook.

Module 2: Effects of Access Management

This module reviews the effects of transportation access management in relation to safety, operations, livability, and the economy. It also discusses the implications of access management programs and techniques as they relate to equity, sustainability, and resilience. Basic methods of evaluating the benefits of access management and related tools are reviewed.

Applicability

Transportation planning, land use planning, transportation systems planning, transportation safety, transportation engineering, sustainable transportation.

Subtopics

- Benefits of Access Management
    - Safety
    - Mobility
    - Livability
    - Economy
- Implications for equity, sustainability, and resilience
- Basic evaluation methods and tools

Learning Objectives

At the end of this module, students will be able to:

- Explain the benefits of access management to transportation systems, urban form, and the economy.
- Describe how equity, sustainability, and resilience are impacted when access is not properly managed.
- Apply basic tools and methods to evaluate the impacts of access management techniques.

Readings

Use the list of suggested resources to identify one or more required and/or optional readings for this module.

Amjadi, R. (2018) TechBrief: Safety evaluation of corner clearance at signalized intersections. FHWA Publication No.: FHWA-HRT-17-085, Washington, D.C.

Avelar, R.E., Dixon, K.K., Brown, L.S., Mecham, M.E., Van Schalkwyk, I. (2013). Influence of land use and driveway placement on safety performance of arterial highways. Transp. Res. Rec. 2398 1 , 101–109. doi:10.3141/2398-12

Butorac, M., J. Bonneson, K. Connolly, P. Ryus, B. Schroeder, K. Williams, Z. Wang, S. Ozkul, and J. Gluck. (2018). NCHRP report 900: Guide for the analysis of multimodal corridor access management. Transportation Research Board of the National Academies, Washington, D.C.

Cunningham, C.M, Miller, M., Findley, D., Schroeder, B., Katz, D., and Foyle, R.S.(2010). Economic effects of access management techniques in North Carolina. Prepared for North Carolina Department of

Transportation, North Carolina State University. https://accessmanagement.info/presentation/48-installation-of-medians-to-replacetwo-way-left-turn-lanes-economic-impacts/

Dixon, K., R. Layton, M. Butorac, P. Ryus, J.L. Gattis, L. Brown, and D. Huntington. (2016). Access management application guidelines. Transportation Research Board of the National Academies, Washington, D.C. (Chapter 9: Economic Impacts).

Gluck, J., H. Levinson, and V. Stover. (1999). NCHRP report 420: Impacts of access management techniques. Transportation Research Board of the National Academies, Washington, D.C.

Riffkin, M., Allen, C., Baker, M., Richman, C., and Dorwart, J. (2013). Raised median economic impact study. Utah Department of Transportation.

Schultz, G.G., Braley, K.T., and Boschert, T. (2010). Relationship between access management and other physical roadway characteristics and safety. Utah Department of Transportation Research and Development Division, Salt Lake City, UT. https://www.researchgate.net/publication/265261301_The_Safety_Effects_of_Access_Management_Treatments_in_the_Vicinity_of_Major_Arterial_Crossroads_in_Utah

Williams, K., Stover, V.G. Dixon, K., Demosthenes, P., Broen, F., Brown, L., Huntington, D. Layton, R. and Seggerman, K. (2014). Access management manual, 2nd Edition. Transportation Research Board of the National Academies, Washington D.C. (Chapter 2).

Williams, K., Dixon, K., Gluck, J., Broen, F. Huffman, C., and Sokolow, G. (2023). NCHRP research report 1032: How to measure and communicate the value of access management. Transportation Research Board of the National Academies, Washington D.C. https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_1032Toolkit.pdf (Toolkit, Fact Sheets, Spreadsheet Tools)

- 3 AMCToolkit Video Planning (Use of the driveway density spreadsheet tool)
- 4 AMCToolkit Video Median Project (Use of spreadsheet tools to evaluate conversion of TWLTL to Median)

Assignments and Activities

A. Homework or In-Class Activity:

a. Using Spreadsheet Tools to Assess Access Spacing and Corner Clearance:

Instructions: Use the spreadsheet tools from NCHRP Research Report 1032: https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_1032Toolkit.pdf to complete the following assignment. Review the PowerPoint slides for Module 2 and those provided for the AMC Toolkit to examine the tools and their application. Using the inputs for the selected spreadsheet tools provided by your instructor, calculate the outputs and describe the impacts.

The scenario corridor for the analysis has an AADT (based on a length of one mile) of 35,000 vpd. The driveway types are all considered to be minor commercial.

- Use the UnsignalizedIntersectionDensity.xlsx tool of the Driveways to obtain a planning-level estimate of the cumulative adverse impacts of frequent driveways on through-vehicle movement. Estimate the percentage of through vehicles in the right lane that are impacted by a right-turning vehicle. The inputs and outputs for this case study reflect conditions for a 50-mph roadway, an estimated average driveway volume of 35 vehicles per hour, and three different unsignalized access spacings – 100 feet, 300 feet, and 500 feet.

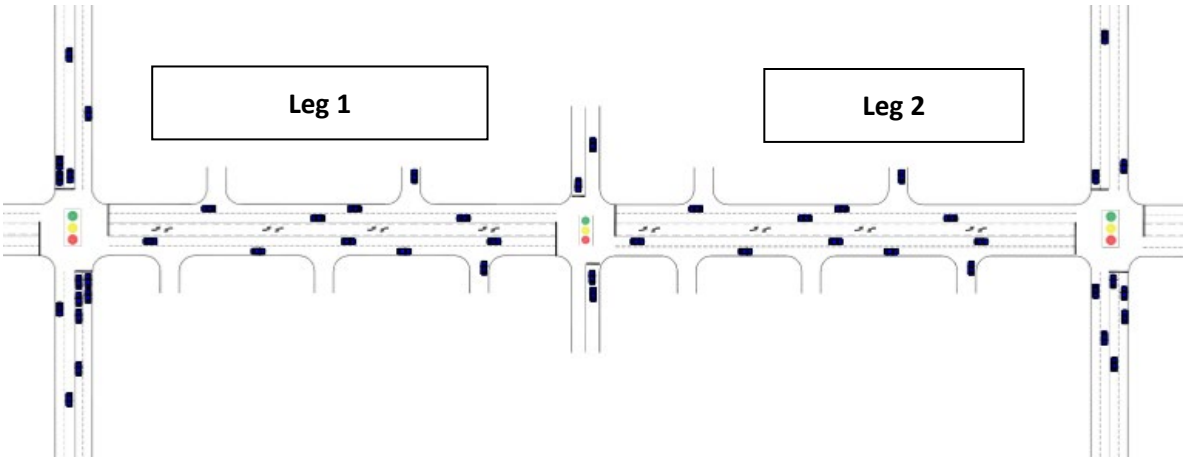
- Use the MedianTypeDwyDensity.xlsx safety tool to contrast variations in driveway density to illustrate how differences in driveway spacing will impact the safety performance of a transportation corridor. For this analysis, the tool is applied to a one-mile segment of arterial with four through lanes, a TWLTL, and an AADT of 35,000 vpd. The access spacing on the arterial is approximately 100 feet on both sides of the roadway. This is equivalent to 50 driveways per side for a total of 100 driveways. A similar evaluation is performed for spacing of 300 feet per mile (i.e., 17 driveways per side for a total of 34 driveways), and 500 feet per mile (or 10 driveways per side for a total of 20 driveways).

b. Using Spreadsheet Tools to Convert a TWLTL to a Raised Median:
Instructions: Use the spreadsheet tools from NCHRP Research Report 1032: https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_1032Toolkit.pdf to complete the following assignment. Review the PowerPoint slides for Module 2 and those provided for the AMC Toolkit to examine the tools and their application. Using the inputs for the selected spreadsheet tools provided by your instructor, calculate the outputs and describe the impacts.

The scenario for this assignment involves a common challenge faced by transportation agencies – the conversion of a continuous two-way left-turn lane (TWLTL) to a raised median. Agencies often propose such conversions due to the poor safety performance of TWLTLs on many high-volume urban/suburban corridors, particularly those with frequent access connections. The analysis considers the following three impacts:

- At a single driveway,
- At least once per quarter mile, and
- At or beyond at least one other driveway.

The scenario involves a five-lane suburban arterial with two-lanes in each direction plus a TWLTL. The corridor is one-half mile long with one-quarter mile spacing of traffic signals, which are located at the beginning, middle, and end of the study section (as shown in Module 2 - Figure 1). In an effort to reduce crashes, the agency has proposed converting the TWLTL to a continuous raised median with one intermediate (existing) signalized intersection.



Module 2 - Figure 1. Case study corridor characteristics.

The annual average daily traffic (AADT) for this corridor is 35,000 vehicles per day (vpd). About as many vehicles exit the network as enter the network at the two-lane collector intersection. For comparison purposes, the same 35,000 vpd can be assumed for each alternative configuration. Leg 1 has two major commercial and two minor commercial driveways on the north side, and four minor commercial driveways on the south side. Leg 2 has four minor commercial driveways on the north side and five minor commercial driveways on the south side. These scenarios are identified in Module 2 - Table 1, including the inputs and associated outputs that can be estimated to assess safety performance for each segment.

Module 2 - Table 1. Potential Case Study Median Scenarios

Configuration	AADT (vpd)	Length – Leg 1 (mi)	Length – Leg 2 (mi)
Existing TWLTL Section	35,000	0.25	0.25
Proposed Continuous Median	35,000	0.25	0.25
Number of Driveways:		2 major commercial 6 minor commercial	9 minor commercial

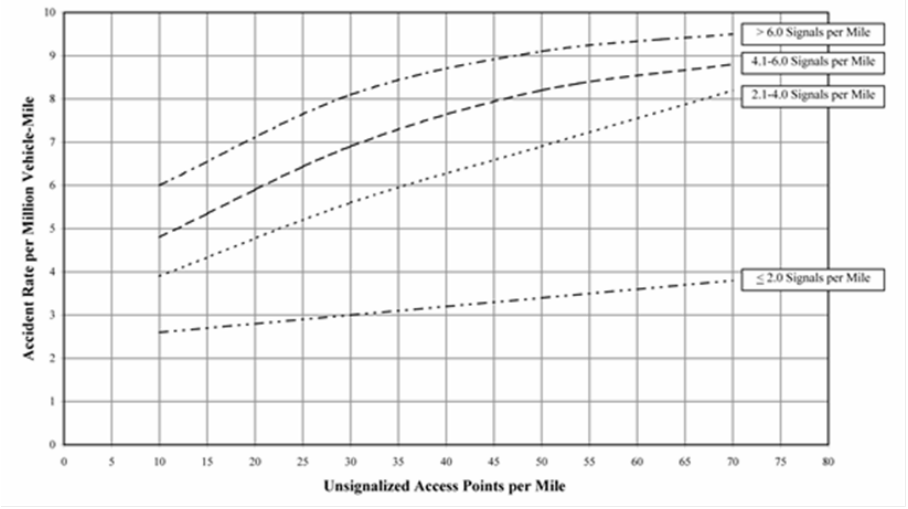
Note to Instructor: Using the case studies and tool descriptions in NCHRP Research Report 1032 and the associated toolkit, provide students with inputs for the selected spreadsheet tools and have them provide outputs and address questions related to impacts. Solutions to the above case studies are provided in NCHRP Research Report 1032. Instructors could modify the inputs as desired to vary the exercise. Class time could be used to demonstrate the tools and variations of outputs for different inputs. The exercise may then be assigned as homework and discussed in a later class.

A. In-class activity

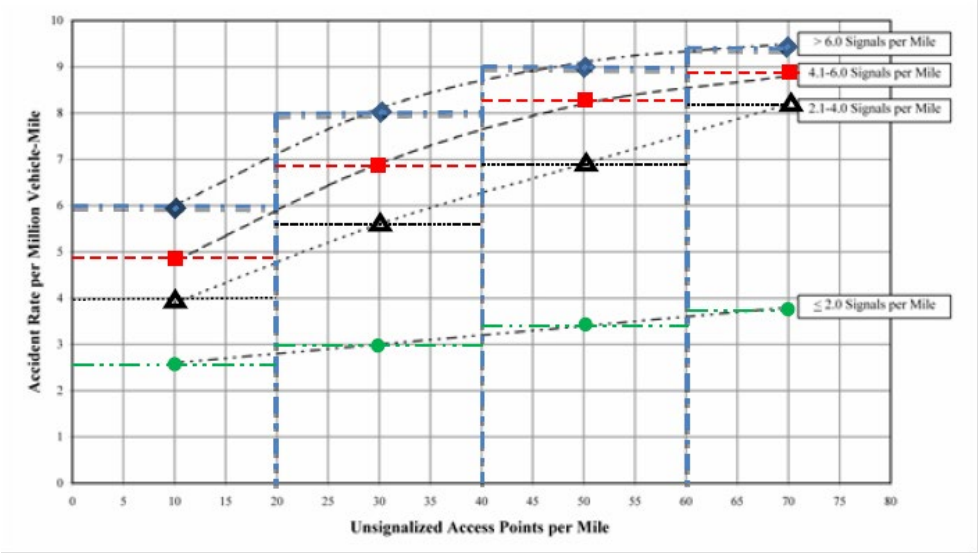
a. Effect of Access Density on Crash Rates

Instructions: Calculate the increase in crash rate resulting from an increase in the number of access connections to illustrate the effect of signalized and unsignalized access density on traffic safety.

1. Refer to Module 2 - Figure 2 and Module 2 - Figure 3. These figures can also be found in Chapter 15 of the TRB Access Management Manual, 2nd ed. (clean and with midpoints of nomograph plots at 20, 30, 50, and 70 unsignalized access connections per mile.)



Module 2 - Figure 2. Effect of signal density and unsignalized access density on average crash rates



Module 2 - Figure 3. Effect of signal density and unsignalized access density on average crash rates

2. Calculate the expected crash rate for a 1.5-mile section of roadways and fill in the blanks; given:

	Existing	Proposed
Number of signals	3	6
Number of unsignalized access connections	21	66
Crash rate: Per million vehicle miles	3.1	

Access Density	Existing	Proposed
Signalized, Per mile		
Unsignalized, Per mile		

Show your calculations below :

- Increase in expected crash rate:
- Expected future crash rate:

Note to Instructor: do example calculations in class to demonstrate how to complete this assignment. Key Message: Traffic signal spacing also influences a roadway's overall crash rate. Roadways with no more than two traffic signals per mile have considerably lower crash rates on average than roadways with more closely spaced signals. Observe that signals tend to have a much greater impact on crash rate than driveway connections.

Demonstrate on the board the calculations to use this as a predictive tool for future crash rates on a 1.0-mile corridor with the following attributes:

Present:	*Future:*	*Ratio:*
2.0 signals/mi	*4.0 signals/mi*	*Rfuture / Rpresent*

20 drives/mi *50 drives/mi*

From Nomograph: Future predicted rate = 6.9/MVM; Present predicted rate = 2.8/MVM

Conclusion: Ratio of 6.9 / 2.8 = 2.463 or nearly 250% higher crash rate in the future.

b. Tragedy of the Commons: Read the Tragedy of the Commons excerpt in class. Discuss how this relates to access management and the long-term sustainability of the transportation system.

The Tragedy of the Commons

Source: Garrett Hardin "The Tragedy of the Commons," Science, Vol 162, December 1968: 1243-1248.

In this essay on population pressures, Garrett Hardin describes the fundamental basis for public control of private property. The scenario is as follows: Picture a pasture open to all. It is expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work as long as wars, poaching, and disease keep the number of people and animals in check. However, eventually, the people begin to strive for stability and gradually war is replaced with social order.

As rational beings, each herdsman then begins to look for ways to maximize his gain. He considers: "What is the utility to me of adding one more animal to my herd?" This utility, says Hardin, has one negative and one positive component.

The positive component is the benefit to the herdsman of having an additional animal to sell. This benefit is equal to nearly +1. The negative component is the additional overgrazing by one more animal. Because these costs are shared by all the herdsmen, the negative utility for an individual herdsman is only a fraction of -1.

Weighing the costs and benefits, the herdsman concludes that the only sensible course is to add another animal to his herd. And another; and another…But this conclusion is reached by every rational herdsman sharing the commons. Therein lies the tragedy. Concludes Hardin: "Each man is locked into a system that compels him to increase his herd without limit-in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all."

Note to Instructor: This qualitative discussion prompts students to consider how the individual demand for direct highway access, while rational, does gradually erode the safety and operational efficiency of the limited highway resource. Society is adversely affected and eventually the costly investment must be rebuilt at considerable expense. Is this a sustainable pattern?

B. Quiz Questions:

Indicate whether the following statements are True or False

1. There is a direct correlation between driveway density and crash rate. (**True**/False)
2. Safety and mobility are benefits of access management. (**True**/False)
3. Roadway access is a factor in the success of businesses, but it is not the most important factor. (**True**/False)

D. Example knowledge probe questions for in-class discussion (or quizzes)

1. What roadway users benefit from access management? How so? (Example: all users, Improved safety, more efficient travel)
2. How might access management increase the resiliency of the transportation system? (Example: Supporting networks offer alternative ways to travel when a road is blocked or evacuations are needed.)
3. How might access management strategies benefit underserved communities? (Examples: Improved accessibility to essential destinations via network connectivity and continuity; bicycle and pedestrian safety is improved for those who cannot drive or afford an automobile)

Learning Outcomes and Evaluation

Module learning outcomes	Competencies	Suggested Tools	Learning outcomes achieved?*	Notes**
Students are able to explain the benefits of access management for all transportation modes.	☒Knowledge ☐Skills ☒Values ABET (3,4)	During class: Module 2 knowledge probe question #1. Module 2 quiz	☐Yes ☐No	
Students are able to describe how equity, sustainability, and resilience are impacted when access is not properly managed.	☒Knowledge ☐Skills ☒Values ABET (3,4)	During Class: Module 2 knowledge probe questions #2 and #3. Module 2 in-class activity b: Tragedy of the Commons	☐Yes ☐No	
Students are able to apply basic methods to evaluate the impacts of selected access management techniques.	☒Knowledge ☒Skills ☐Values ABET (1,3,4,6)	During Class: Module 2 in-class activity a: Effect of Access Density on Crash Rates After Class: Module 2 homework a: Using Spreadsheet Tools to Assess Access Spacing and Corner Clearance Module 2 homework b: Using Spreadsheet Tools to Convert a TWLTL to a Raised Median	☐Yes ☐No	

**If the learning outcome is not achieved, identify what additional steps are needed to achieve the learning outcome and improve student learning.*

***Identify the areas that are difficult for students and the areas in which students are excelling. Are there other observations?*

Learning Outcome Assessment Rubric

Learning Outcomes	Excellent	Good	Poor
Students are able to explain the benefits of access management for all transportation modes.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to describe how equity, sustainability, and resilience are impacted when access is not properly managed.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to apply basic methods to evaluate the impacts of selected access management techniques.	Capable of applying a variety of basic methods and tools to evaluate impacts.	Capable of applying some basic methods and tools to evaluate impacts.	Incapable of applying basic methods and tools to evaluate impacts.

Module Evaluation

Before Module

Please describe your familiarity with the following topics:

Benefits of access management to transportation systems, urban form, and the economy.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

How equity, sustainability, and resilience are impacted when access is/is not properly managed.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

Apply basic tools and methods to evaluate the impacts of access management techniques.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

After Module

Think about the topics discussed in this module and how familiar you were with the topics before class. Has your understanding of the topic improved?

Benefits of access management to transportation systems, urban form, and the economy.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

How equity, sustainability, and resilience are impacted when access is/is not properly managed.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Apply basic tools and methods to evaluate the impacts of access management techniques.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Notes

The example knowledge probe questions, and homework assignment Effect of Access Density on Crash Rates, are adapted from the following resources:

U.S. Department of Transportation. (2017). NHI Course 133078, Access Management: Solutions for All Users, Participant Workbook.

Williams, K., Dixon, K., Gluck, J., Broen, F. Huffman, C., and Sokolow, G. (2023) NCHRP Research Report 1032: How to Measure and Communicate the Value of Access Management. Transportation Research Board of the National Academies, Washington D.C. https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_1032Toolkit.pdf

Module 3: Land Development and Access

This module reviews the relationship between land development and access and methods for improving access design through the land use planning and development process. It familiarizes students with the counterproductive land use and transportation cycle, how land division and subdivision activity impact access design, and methods to manage access in the land development process.

Applicability

Transportation planning, land use planning, transportation engineering, sustainable transportation

Subtopics

- Land use and transportation cycle
- Impact of land division and subdivision activity on access design
- Methods to manage access in the land development process (e.g., activity centers, right of way and street network connectivity, unified access and circulation/interparcel cross access)

Learning Objectives

At the end of this module, students will be able to:

- Explain the land use and transportation cycle and why it is counterproductive
- Describe how land division and subdivision activity impacts access design
- List methods to manage access in the land development process.

Readings

Use the list of suggested resources to identify one or more required and/or optional readings for this module. Starred readings are especially recommended.

Dixon, K., R. Layton, M. Butorac, P. Ryus, J.L. Gattis, L. Brown, and D. Huntington. (2016). Access management application guidelines. Transportation Research Board of the National Academies, Washington, D.C. (Chapter 4: Alternative Access Strategies and Applications, Chapter 19: Special Site Circulation and Access Techniques; Chapter 20: Summary of Land Use Considerations)

Florida LTAP (Gary Sokolow and Kristine Williams). (2021). Access management – The basics and more. Part 2: Land development and access management techniques. https://floridaltap.org/recorded-webinar-access-management-the-basics-and-more/

Williams, K. (2020). NCHRP synthesis 549: Incorporating roadway access management into local ordinances. Washington D.C.: Transportation Research Board of the National Academies.

Williams, K., Stover, V.G. Dixon, K., Demosthenes, P., Broen, F., Brown, L., Huntington, D. Layton, R. and Seggerman, K. (2014). Access management manual, 2nd Edition. Transportation Research Board of the National Academies, Washington D.C. (Chapter 9: Land Development and Access; Chapter 10: Corridor Access Management Plans).*

Stover V. and Koepke, F. (2002). Transportation and land development, 2nd ed. Washington D.C.: Institute of Transportation Engineers.

Assignments and Activities

A. Homework

a. Access management assessment:

Instructions: Your instructor will identify a corridor or area for you to perform a site access management assessment. Examine the roadway access conditions for the study site and propose solutions to address access management issues. Summarize key findings in a brief (2-page) report identifying any problems you identified along with some suggestions for improvement. Include photos and aerial images illustrating the access conditions. You will discuss your findings and solutions in class.

B. In-class activity:

a. Interactive Discussion:

Instructions: Review the site plans for scenarios 1 and 2 (provided in the PowerPoint for Module 3). Consider these issues: Access to main and crossroads; Internal circulation and parking layout implications for roadway access; Multimodal implications of the two scenarios. Discuss the following questions:

- How does land use planning affect access and parking management?
- How do access and parking change in different land use contexts?
- How do the two scenarios impact modal options?

b. Simple Access Management Assessment:

Instructions: Examine the site plan in Module 3 - Figure 1. The roadway to the south is a state arterial roadway with a connection spacing of 440 ft and a full median opening spacing of 1320 ft. The other streets are locally maintained and have no access management standards. The shopping center site is being redeveloped and the new owner purchased sites 1 and 3, but site 2 remains under separate ownership. She proposes to build a strip mall on the site and retain the gas station.

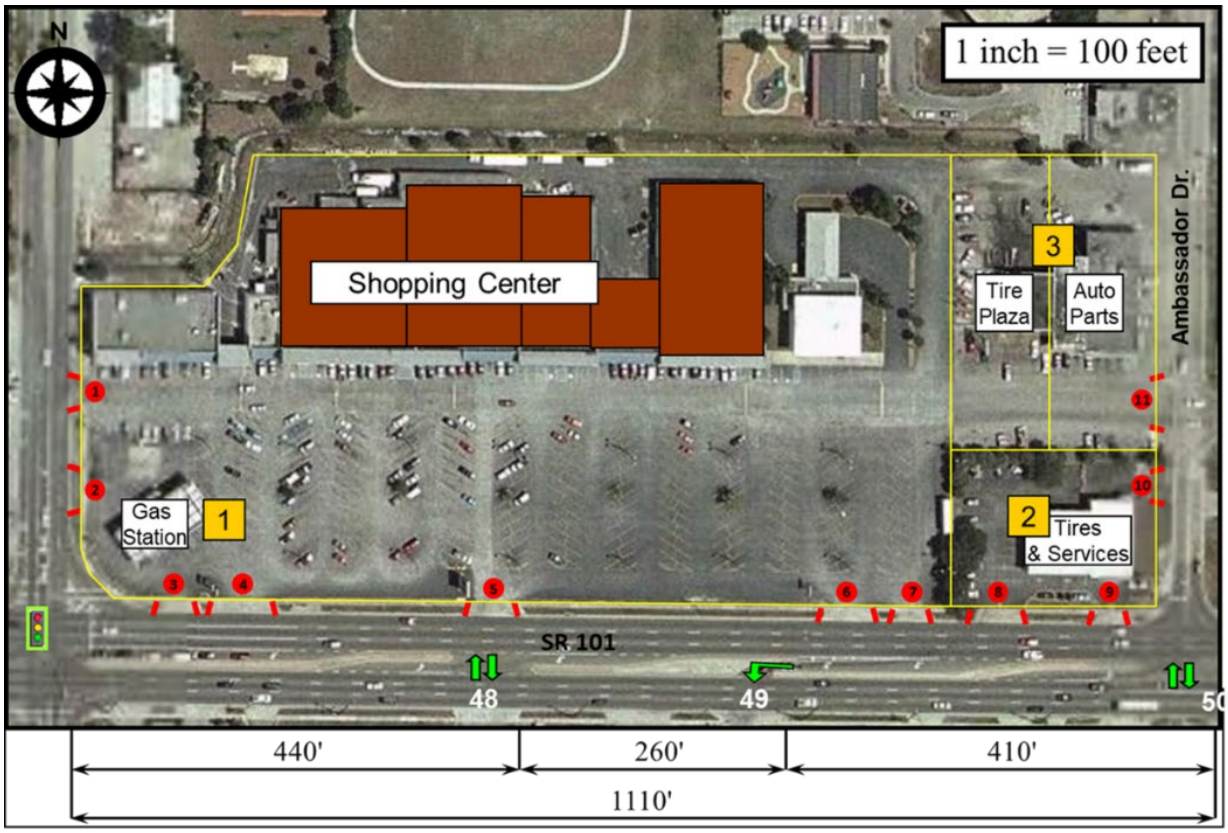
a. List as many access management problems as you can.

- (2, 3, 4, 9) inadequate corner clearance
- (1-7, 11) excessive, poorly designed driveways into Site 1
- (48) full median opening near the signal, numerous conflicts
- Site 2 has too many driveways, and lacks connection to Site 1
- No defined pedestrian access, parking creates a barrier, driveways create conflicts with cyclists and pedestrians
- Vehicles parking at building frontage conflict with circulating traffic.

b. Note how you might improve the overall bike/ped and vehicular access and circulation plan for this site. How would you change the access design? What strategies might you use to implement your concepts?

- Remove superfluous driveways as a condition of redevelopment
- Require cross-access agreement with Site 2, enforce if Site 2 redevelops
- Incorporate pedestrian facilities
- Encourage buildings at street frontage with direct pedestrian access

- Prohibit parking on circulation drive
- Redesign median, close full opening (48)
- Consider the roundabout at Ambassador Dr.



Module 3 - Figure 1. Site Plan

Note to Instructor: Show students the aerial image of a corridor and ask them to a) identify access management issues, and b) propose possible solutions. The exercise and solutions are provided in the Module 3 PowerPoint. This assignment can be provided as homework and discussed in the next class session.

C. Quiz Questions

1. Which of the following best describes the "transportation and land use cycle" also known as the sprawl cycle?
   - **a) The counterproductive cycle of land use and transportation events that requires continuing capital investment in arterial improvements.**
   - b) The continuous cycle whereby land use decisions reinforce the function of transportation corridors.
   - c) The cycle of congestion that restricts development on major arterials.
   - d) The integration of transportation and land use decision-making to support access management.
2. Read the scenario and answer the question, providing examples of at least two techniques and how they would be implemented.

Scenario: As the new transportation director for a mid-sized city, you are asked to develop an improvement plan for an undivided four-lane highway in the city that has a high crash rate and is becoming congested. There are many small businesses on the highway and a few large vacant parcels of land that are owned by a single owner who is interested in dividing them into small lots for future sale. The supporting street network is relatively sparse and existing streets are not connected. You realize that access management is important and have decided to include access management strategies in your improvement plan.

a. What are some access management techniques you might apply to this corridor and why?

Learning Outcomes and Evaluation

Module learning outcomes	Competencies	Suggested Tools	Learning outcomes achieved?*	Notes**
Students are able to explain the land use and transportation cycle and why it is counterproductive.	☒Knowledge ☐Skills ☒Values ABET (3,4)	During class: Module 3 quiz	☐Yes ☐No	
Students are able to describe the impact of land division and subdivision activity on access design.	☒Knowledge ☐Skills ☒Values ABET (3,4,6)	During class: Module 3 in-class activity a: Interactive Discussion Module 3 in-class activity b: Simple Access Management Assessment	☐Yes ☐No	
Students are able to list appropriate methods to manage access in the land development process.	☒Knowledge ☒Skills ☐Values ABET (3,7)	After Class: Module 3 Homework a: Access Management Assessment Module 3 quiz Module 1 Homework Assignment b: Technique Reports	☐Yes ☐No	

**If the learning outcome is not achieved, identify what additional steps are needed to achieve the learning outcome and improve student learning.*

***Identify the areas that are difficult for students and the areas in which students are excelling. Are there other observations?*

Learning Outcome Assessment Rubric

Learning Outcomes	Excellent	Good	Poor
Students are able to explain the land use and transportation cycle and why it is counterproductive.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to describe the impact of land division and subdivision activity on access design.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to list appropriate methods to manage access in the land development process.	Capable of listing several methods for a given scenario, with in-depth explanation.	Capable of listing some methods for a given scenario, with adequate explanation.	Incapable of listing methods for a given scenario and/or explaining them.

Module Evaluation

Before Module

Please describe your familiarity with the following topics:

The land use and transportation cycle and why it is counterproductive.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

The impact of land division and subdivision activity on access design.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

Appropriate methods to manage access in the land development process.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

After Module

Think about the topics discussed in this module and how familiar you were with the topics before class. Has your understanding of the topic improved?

The land use and transportation cycle and why it is counterproductive.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

The impact of land division and subdivision activity on access design.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Appropriate methods to manage access in the land development process.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Notes

No Notes.

Module 4: Access Location and Spacing

This module addresses considerations in access location, the importance of functional area in access location and spacing criteria, and the engineering concepts behind these criteria. Administrative techniques used to control the number and location of access points, including access classification systems and standards, are addressed in Module 6: Access Management Policy and Process.

Applicability

Transportation planning, transportation engineering.

Subtopics

- Corner clearance and functional area
- Unsignalized access spacing
- Signalized access spacing

Learning Objectives

At the end of this module, students will be able to:

- Describe the difference between the upstream and downstream functional area.
- Explain the different concepts that may be used to determine access spacing.
- Calculate upstream and downstream functional intersection area.

Readings

Use the list of suggested resources to identify one or more required and/or optional readings for this module.

Dixon, K., R. Layton, M. Butorac, P. Ryus, J.L. Gattis, L. Brown, and D. Huntington. (2016). Access management application guidelines. Transportation Research Board of the National Academies, Washington, D.C. (Chapter 12: Corridor Design, Chapter 13:Signalized Access Spacing)

Dixon, K., Fitzpatrick, K., Mousavi, S., Potts, I., Harwood, D., Grotheer, J., and Ronchetto, J. (2020). NCHRP research report 929: Unsignalized full median openings in proximity to signalized intersections. Transportation Research Board of the National Academies, Washington, D.C.: The National Academies Press.

Dixon, K., Gattis, J., Park, E. S., Brown, L., Shirinzad, M., Blaschke, M., Layton R., Stover, V., Demosthenes, P., Sutherland, L., and Levinson H. (2022). NCHRP research report 977: Access management in the vicinity of interchanges, Vol. 1 and 2. Transportation Research Board of the National Academies, Washington, D.C.: The National Academies Press.

Stover, V. (2008). Access connections on opposite sides of a roadway. Center for Urban Transportation Research, University of South Florida. https://accessmanagement.info/wp-content/uploads/2013/07/StoverAccessConnections.pdf

Williams, K., Stover, V.G. Dixon, K., Demosthenes, P., Broen, F., Brown, L., Huntington, D. Layton, R. and Seggerman, K. (2014). Access management manual, 2nd Edition. Transportation Research Board of the National Academies, Washington D.C. (Chapter 15: Signalized and Unsignalized Access Spacing).

Williams, K., Dixon, K., Gluck, J., Broen, F. Huffman, C., and Sokolow, G. (2023) NCHRP research report 1032: How to measure and communicate the value of access management. Transportation Research Board of the National Academies, Washington D.C. https://www.trb.org/Publications/Blurbs/182924.aspx#:~:text=The%20TRB%20National%20Cooperative%20Highway,agency%20staff%20and%20their%20consultants

Assignments and Activities

A. Homework:

a. Assessing Unsignalized Intersections:

Instructions: Use the spreadsheet tools from NCHRP Research Report 1032: https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_1032Toolkit.pdf to complete the following assignment. Review the PowerPoint slides for Module 4 and those provided for the AMC Toolkit to examine the tools and their application. Using the inputs for the selected spreadsheet tools provided by your instructor, calculate the outputs and describe the impacts.

Using the UnsignalizedIntersectionDensity.xlsx, calculate the total number of crashes and variations in the safety effects of increasing unsignalized intersection density for varying inputs. Add at least three different sets of inputs for AADT, segment length, and number of future unsignalized cross roads per mile. Make a note of the resulting outputs and describe how differences in intersection density influence the safety performance of transportation corridors.

b. Estimating the Increase in Travel Time After Adding New Traffic Signals:

Instructions: Use the spreadsheet tools from NCHRP Research Report 1032: https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_1032Toolkit.pdf to complete the following assignment. Review the PowerPoint slides for Module 4 and those provided for the AMC Toolkit to examine the tools and their application. Using the inputs for the selected spreadsheet tools provided by your instructor, calculate the outputs and describe the impacts.

Using the M. Signal Spacing tab of the AM_Mobility_Tools Final Modules.xlsx tool, calculate the estimated percent change in travel time for signal densities of 3, 6, and 8 signals per mile. Make a note of the resulting outputs for the estimated percent change in travel time for each input and describe the effects of increasing signal density.

c. Estimating Progression Speed Based on Signal Spacing and Cycle Length:

Instructions: Use the spreadsheet tools from NCHRP Research Report 1032: https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_1032Toolkit.pdf to complete the following assignment. Review the PowerPoint slides for Module 4 and those provided for the AMC Toolkit to examine the tools and their application. Using the inputs for the selected spreadsheet tools provided by your instructor, calculate the outputs and describe the impacts.

Using the M. Driveway Spacing tab of the AM_Mobility_Tools Final Modules.xlsx tool, calculate the percent of right-lane, through-vehicles affected at a single driveway, the percent of right-lane, through-vehicles affected at least once per 1/4 mile, and the percent of affected right-lane, through-vehicles that would extend to or beyond at least one driveway. Add at least three different sets of inputs for varying cycle lengths (between 60 seconds and 120 seconds) and traffic signal spacing (between 660 feet and 2640 feet). Make a note of the resulting outputs and describe how differences in driveway density influence the mobility performance of transportation corridors.

Note to Instructor: Using the case studies and tool descriptions in NCHRP Research Report 1032 and the associated Toolkit, provide students with inputs for the selected spreadsheet tools and have them provide outputs and address questions related to impacts. Instructors could modify the inputs as desired to vary the exercise. Class time could be used to demonstrate the tools and variations of outputs for different inputs. The exercise may then be assigned as homework and discussed in a later class.

B. In-Class Activity

a. **Calculating the upstream functional distance:** Using the Deceleration Maneuver Method for distance d_2, what is the upstream functional distance for the following conditions?

Speed = 40 mph

Perception-reaction time = 2.0 sec.

Queue storage, d3 = 175 ft.

Answer: 570

b. **Functional Area Assessment:** Review the aerial image and map provided in the handout in Appendix A (also provided in the Module 4 PowerPoint). Measure the upstream and downstream functional areas of the intersection in the provided map and use the table provided by your instructor to complete the following:

- Document the functional distance for D1 and D2 (assume 100' for D3).
- Identify access connections within the functional area.

Discuss your findings:

- Describe the characteristics of the upstream and downstream functional areas.
- How many access connections are within the functional area?
- What are the safety and capacity implications of these characteristics and access connections?
- Why is it important to protect the intersection functional area?

C. Quiz Questions

1. The upstream dimension of the functional area of a signalized intersection is shorter than the downstream dimension. (**False**)
2. The safety benefits of access management at intersections are primarily attributable to:

a) Better signal coordination
b) Fewer traffic conflict locations
c) Better sign location
d) Longer traffic queues

3. Which statement best conveys the principle of intersection hierarchy:

   a) Avoid connecting a lower-class roadway with a much higher-class roadway; instead provide transitions from one stage of a trip to the next.
   b) The functional area of an intersection extends both upstream and downstream from the physical area.
   c) Drivers have more collisions when presented with complex driving situations.
   d) Driveways should not be located within the functional area of intersections.

4. Which of the following is NOT an element of the upstream functional distance of an intersection?

   a) Distance traveled during perception-reaction time.
   b) Distance traveled while maneuvering laterally and decelerating to a stop.
   c) Driveway radius and width.
   d) Queue storage length.

5. The most undesirable location for access to a corner property at the intersection of a major roadway and a minor roadway is:

   a) downstream on the major roadway.
   b) upstream on the major roadway.

E. Example knowledge probe questions for in-class discussion (or quizzes)

1. Explain the relationship between speed differential, access, and safety.
2. How might poorly managed access impact driver workload?
3. Which factors related to context (rural vs urban) and traffic conditions affect perception-reaction time? How can we account for these differences when calculating the upstream functional distance?

Learning Outcomes and Evaluation

Module learning outcomes	Competencies	Suggested Tools	Learning outcomes achieved?*	Notes**
Students are able to describe the difference between upstream and downstream functional area.	☒Knowledge ☐Skills ☐Values ABET (3,7)	<u>During Class</u>: Module 4 quiz	☐Yes ☐No	
Students are able to explain the different concepts that may be used to determine access spacing.	☒Knowledge ☐Skills ☐Values ABET (3,7)	<u>During Class</u>: Module 4 knowledge probe questions #1, #2, and #3. <u>After Class</u>: Module 4 homework a: Assessing Unsignalized Intersections Module 4 homework b: Estimating the Increase in Travel Time After Adding New Traffic Signals Module 4 homework c: Estimating Progression Speed Based on Signal Spacing and Cycle Length	☐Yes ☐No	
Students are able to calculate upstream and downstream functional intersection area.	☐Knowledge ☒Skills ☐Values ABET (1,6)	<u>During Class</u>: Module 4 in-class activity a: Calculating Upstream Functional Distance Module 4 in-class activity b: Functional Area Assessment	☐Yes ☐No	

**If the learning outcome is not achieved, identify what additional steps are needed to achieve the learning outcome and improve student learning.*

***Identify the areas that are difficult for students and the areas in which students are excelling. Are there other observations?*

Learning Outcome Assessment Rubric

Learning Outcomes	Excellent	Good	Poor
Students are able to describe the difference between upstream and downstream functional area.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to explain the different concepts that may be used to determine access spacing.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to calculate upstream and downstream functional intersection area.	Capable of using tools and calculating functional areas.	Somewhat capable of using tools and calculating functional areas.	Incapable of using tools and calculating functional areas.

Module Evaluation

Before Module

Please describe your familiarity with the following topics:

Difference between upstream and downstream functional area.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

Different concepts that may be used to determine access spacing.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

How to calculate upstream and downstream functional intersection area.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

After Module

Think about the topics discussed in this module and how familiar you were with the topics before class. Has your understanding of the topic improved?

Difference between upstream and downstream functional area.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Different concepts that may be used to determine access spacing.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

How to calculate upstream and downstream functional intersection area.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Notes

Some of the example learning objectives, lecture slides, and exercises adapted from the following resources:

U.S. Department of Transportation. (2017). NHI Course 133078, Access Management: Solutions for All Users, Participant Workbook.

Module 5: Access Design

This module reviews the fundamentals of access design. It addresses roadway design considerations, including medians, auxiliary lanes, and midblock treatments, as well as site planning and circulation design.

Applicability

Transportation planning, transportation engineering,

Subtopics

- Functional Circulation
- Roadway
  - Medians
  - Auxiliary Lanes and Warrants
  - Midblock Treatments
- Site planning and circulation design
  - Throat length
  - Influence on on-site circulation

Learning Objectives

At the end of this module, students will be able to:

- Describe the concept of functional circulation.
- Explain how roadway design elements influence through movement and corridor safety.
- Calculate the safety effects of various design elements.

Readings

Use the list of suggested resources to identify one or more required and/or optional readings for this module.

AASHTO. (2018). A Policy on the Geometric Design of Highways and Streets.

Dixon, K., R. Layton, M. Butorac, P. Ryus, J.L. Gattis, L. Brown, and D. Huntington. (2016). Access management application guidelines. Transportation Research Board of the National Academies, Washington, D.C. (Chapter 12: Corridor Design)

Gattis, J. J., Gluck, J. S., Barlow, J. M., Eck, R. W., Hecker, W. F., and Levinson, H. S. (2010). NCHRP report 659: Guide for the geometric design of driveways. Transportation Research Board of the National Academies, Washington, D.C.: The National Academies Press.

Transportation Research Board (TRB). (2023). Access management communication toolkit: How to measure and communicate the value of access management. NCHRP 1032. https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_1032Toolkit.pdf

Williams, K., Stover, V.G. Dixon, K., Demosthenes, P., Broen, F., Brown, L., Huntington, D. Layton, R. and Seggerman, K. (2014). Access management manual, 2nd Edition. Transportation Research Board of the National Academies, Washington D.C. (Chapters 16, 17, and 20).

Assignments and Activities

A. Homework:

a. Assessing the Safety Effects of Turn Lanes:

Instructions: Use the spreadsheet tools from NCHRP Research Report 1032: https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_1032Toolkit.pdf to complete the following assignment. Review the PowerPoint slides for Module 5 and those provided for the AMC Toolkit to examine the tools and their application. Using the inputs for the selected spreadsheet tools provided by your instructor, calculate the outputs and describe the impacts.

Using the LT_3LegIntersections tool, calculate the safety effects of one approach versus two approaches for a combination of up to 4 facility types, AADT for major roads, and AADT for minor roads. Make a note of the resulting outputs and describe how differences in facility type and AADT compare for 1 approach versus 2 approaches.

Repeat the exercise for the RT-3LegIntersections, LT_4LegIntersections.xlsx, RT-3LegIntersections.xlsx, RT-4LegIntersections.xlsx.

b. Estimating Delay Reduction from Adding a Turn Lane:

Instructions: Use the spreadsheet tools from NCHRP Research Report 1032: https://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_1032Toolkit.pdf to complete the following assignment. Review the PowerPoint slides for Module 5 and those provided for the AMC Toolkit to examine the tools and their application. Using the inputs for the selected spreadsheet tools provided by your instructor, calculate the outputs and describe the impacts.

Using the M. Right-Turn Lanes tab of the AM_Mobility_Tools Final Modules.xlsx tool, calculate the estimated delay reduction for through vehicles, additional delay reduction due to pedestrian crossing, and total delay reduction. Add at least three different sets of inputs for posted speed limit, number of through lanes, through volumes, right turn volume, and pedestrian volume crossing on the minor road. Make a note of the resulting outputs and describe how differences in roadway facilities influence the performance of transportation corridors.

Repeat the exercise for the M. Left Turn Lanes tab of the AM_Mobility_Tools Final Modules.xlsx tool.

Note to Instructor: Using the case studies and tool descriptions in NCHRP Research Report 1032 and the associated Toolkit, provide students with inputs for the selected spreadsheet tools and have them provide outputs and address questions related to impacts. Solutions to the above case studies are provided in NCHRP Research Report 1032. Instructors could modify the inputs as desired to vary the exercise. Class time could be used to demonstrate the tools and variations of outputs for different inputs. The exercise may then be assigned as homework and discussed in a later class.

B. In-Class Activity

a. Auxiliary Lane Assessment: Review the aerial image and map provided in the handout in Appendix B (also provided in the Module 5 PowerPoint).

- Identify the factors that are considered in the warranting of the auxiliary lane.

  Answer: Factors considered in the warranting of an auxiliary lane:

  a. *Posted speed*

  b. *Opposing volume*

  c. *Proportion of turning vehicles (demand)*

- Review the aerial image and map provided in the handout (and on the next slide) and complete the following:
  - Identify locations where auxiliary lanes are needed by volume warrants and benefit/cost analysis.
    - Note: Assume an even distribution of traffic in all lanes and 45 mph on US - 29 and 35 mph on the intersecting roadway.

Discuss your findings:

a. Does the addition of auxiliary lanes create any challenges in spacing adjacent connections?

b. How might the addition of the auxiliary lanes influence safety and traffic flow?

C. Quiz Questions:

Indicate whether the following statements are True or False

1. Roads with a median are about 30% safer than those with a TWLTL. (**True**/False)
2. U-turns are safer than direct left-turns. (**True**/False)
3. Raised medians have no safety effects for pedestrians. (True/**False**)
4. Directional medial openings increase the number of turn conflicts as compared to a full median opening. (True/**False**)

F. Example knowledge probe questions for in-class discussion (or quizzes)

1. Review the video in the Module 5 PowerPoint for this curriculum (video of a car going the wrong way along the side of a roadway):
   a. Describe what could be done to address the issue demonstrated in this video. Do you notice any other safety concerns in this video?
2. What are the three components of upstream functional distance (D_1, D_2, and D_3)?

   Answer:

   D3 (the queue storage distance between the stop bar and the end of the queue).

   D2 (the deceleration-maneuver distance that takes a turning vehicle from the through lane, then brings it to a stop at the back of the queue).

   D1 (the perception-reaction time – outside the physical bounds of the auxiliary lane).

3. What are the differences between the volume warrants for three-leg intersections versus four-leg intersections? What are the implications of these observed differences?

   Answer:

   Observation:

   The volume warrants for three-leg intersections decrease as roadway volumes increase.

   The volume warrants for four-leg intersections are much lower than three-leg but remain constant with volume.

   Implications:

   Most four-leg intersections on mobility corridors in urban or suburban settings probably warrant auxiliary lanes.

Learning Outcomes and Evaluation

Module learning outcomes	Competencies	Suggested Tools	Learning outcomes achieved?*	Notes**
Students are able to describe the concept of functional circulation.	☒Knowledge ☐Skills ☐Values ABET (3,7)	During class: Module 5 knowledge probe Question #1	☐Yes ☐No	
Students are able to explain how roadway design elements influence through movement and corridor safety.	☒Knowledge ☐Skills ☒Values ABET (3,4,7)	During Class: Module 5 quiz Module 5 knowledge probe Questions #2 and #3 Module 5 in-class activity a: Auxiliary Lane Assessment	☐Yes ☐No	
Students are able to calculate the safety effects of various design elements.	☒Knowledge ☒Skills ☐Values ABET (1,4,6)	During Class: Practice the use of spreadsheet tools and nomographs. After Class: Module 5 homework a: Assessing the Safety Effects of Turn Lanes Module 5 homework b: Estimating Delay Reduction from Adding a Turn Lane	☐Yes ☐No	

**If the learning outcome is not achieved, identify what additional steps are needed to achieve the learning outcome and improve student learning.*

***Identify the areas that are difficult for students and the areas in which students are excelling. Are there other observations?*

Learning Outcome Assessment Rubric

Learning Outcomes	Excellent	Good	Poor
Students are able to describe the concept of functional circulation.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to explain how roadway design elements influence through movement and corridor safety.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to calculate the safety effects of various design elements.	Capable of using tools and calculating ….	Somewhat capable of using tools and calculating ….	Incapable of using tools and calculating ….

Module Evaluation

Before Module

Please describe your familiarity with the following topics:

The concept of functional circulation.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

How roadway design elements influence through movement and corridor safety.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

Calculate the safety effects of design elements.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

After Module

Think about the topics discussed in this module and how familiar you were with the topics before class. Has your understanding of the topic improved?

The concept of functional circulation.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

How roadway design elements influence through movement and corridor safety.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Calculate the safety effects of design elements.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Notes

Some of the example learning objectives, lecture slides, and select exercises adapted from the following resources:

U.S. Department of Transportation. (2017). NHI Course 133078, Access Management: Solutions for All Users, Participant Workbook.

Module 6: Access Management Policy and Process

This module examines policies, regulations, and procedures that are used to implement access management at the state and local government levels. It reviews access classification systems and standards, land development regulations for access management, access permitting, and transportation impact analysis.

Applicability

Transportation planning, land use planning, transportation engineering, civil engineering, public administration, law.

Subtopics

- Components of access management programs
- Regulations (land development regulations, ordinances, administrative rules)
- Access permitting
- Transportation Impact Analysis

Learning Objectives

At the end of this module, students will be able to:

- List the components of systemwide access management regulations.
- Explain the driveway permitting process.
- Evaluate the adequacy of state and local access management policies and procedures.

Readings

Use the list of suggested resources to identify one or more required and/or optional readings for this module.

Dixon, K., Layton, R., Butorac, M., Ryus, P., Gattis, J.L., Brown, L. and Huntington, D. (2016). Access management application guidelines. Transportation Research Board of the National Academies, Washington D.C. (Chapter 6: Legal Authority for Access Management, Chapter 8: Permitting Process and Methods)

FDOT. (2019). Access management guidebook. Tallahassee, Florida. Retrieved from https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/systems/documents/fdot-access-management-guidebook---nov-19.pdf?sfvrsn=c5aa6e5_4

Williams, K. (2017). Model access management policies and regulations for Florida cities and counties, 2nd Edition. Prepared for the Florida Department of Transportation.

Williams, K. (2020). NCHRP synthesis 549: Incorporating roadway access management into local ordinances. Transportation Research Board of the National Academies.

Williams, K., Dixon, K., Gluck, J., Broen, F. Huffman, C., and Sokolow, G. (2023). NCHRP research report 1032: How to measure and communicate the value of access management. Transportation Research Board of the National Academies, Washington D.C. (AMC Toolkit, pp. 7-18)

Williams, K., Kramer, J., and Barber, J. (2018). Florida access management benchmarking study. Florida Department of Transportation. Tallahassee, Florida. https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/research/reports/fdot-bdv25-977-41-rpt.pdf

Williams, K., Stover, V.G. Dixon, K., Demosthenes, P., Broen, F., Brown, L., Huntington, D. Layton, R. and Seggerman, K. (2014). Access management manual, 2nd Edition. Transportation Research Board of the National Academies, Washington D.C. (Chapter 6: State Access Management Policies and Programs, Chapter 8: Local Government Policies and Programs, Chapter 11: Access Permitting)

Assignments and Activities

A. Homework

a. State Highway Access Management Policy Audit:

The purpose of this exercise is to familiarize students with the components of a comprehensive access management program and how they are addressed in state access management regulations and standards. This is an advanced assignment and can form the basis for a midterm or final project and/or service learning project conducted in collaboration with agency staff.

Instructions: Identify and review relevant materials from your state transportation agency's access management program or processes (your instructor may provide relevant material to the class). Complete the worksheets provided in tabular form. Using the responses to the questions provided below the checklist, write a report summarizing the state's program or process. The reports should be concise and provide citations and/or electronic links to each item identified in the notes and/or body of the report. Identify potential strengths and weaknesses of the program or process based on the review. The results will be discussed in class.

What are the sources of authority and guidance for the state access management program or process?	**Notes**			
1. Statute (identified in state transportation law or special access management statute)				
2. State Access Management Manual				
3. Administrative Rules (Access Categories or Classifications)				
4. Administrative Rules (Access Permitting)				
Does the state transportation agency's access management program include the following?	**Yes**	**No**	**Partly**	**Notes**
5. Access management (AM) categories based on roadway function				
6. Purpose and criteria for each AM category				

7. Assignment of an AM category to each roadway segment				
8. Standards for each category address:				
a) signal spacing				
b) unsignalized access spacing (driveways, median openings)				
c) auxiliary lanes (warrants for)				
d) medians				
9. Permitting criteria for deviations from standards				
10. Change in use criteria for access permitting				
11. Appeals when an application is denied				
Other applicable AM policies, procedures, regulations, or standards Identified:				

State Program Evaluation Questions

1. What criteria are applied by the state in permitting access to state highways? Does the state have connection spacing standards? Are state-maintained highways assigned access categories for the purpose of access management? If so, what are the access spacing standards for state highways?
2. What, if any, driveway design standards are in place? Do driveway design standards appear to be old or outdated? Do driveway design standards address driveway throat length?
3. How are decisions made regarding the need for right-turn lanes into developments? When are they required?
4. Are nontraversable medians incorporated into the design of major roadways? Are there standards for median opening spacing and design? Are there policies in place that address the use of medians versus continuous two-way left turn lanes?
5. How is access management dealt with in development review and access permitting? Is there a site plan review process in place for the review of site access and circulation? Are traffic impact assessment procedures and requirements in place and do they address access management issues?

6. Is there a clear process for addressing requests for deviation from access spacing standards?

7. Does the state promote the use of raised medians in the design of state highways? If so, how does the state accommodate left turns or address requests for median openings?

8. Does the state have a policy or practice related to coordinating with local governments on access management? States with comprehensive access management programs may have specific policies or rules related to coordination with local government. Many states have no formal policy related to local access management practices for state highways but may coordinate on an informal basis with communities that express an interest in access management.

9. Conclude with a summary of the state's access management policies and procedures based on your review and your assessment of its potential strengths and weaknesses based on the readings and guidance your instructor has provided.

b. Local Agency Access Management Policy Audit:

The purpose of this exercise is to familiarize students with the components of a comprehensive access management program and how it is addressed in local government plans, policies, regulations, and standards. This is an advanced assignment and can form the basis for a midterm or final project and/or service-learning project conducted in collaboration with agency staff.

Directions: Select one or more local governments in your area and select a document to review. Documents may include the local comprehensive plan (transportation element, land use element, mobility element, other) and/or thoroughfare plan, land development code, and public works design standards, as well as other applicable agency documents to the class. Complete the following worksheet and evaluation questions. Using the responses to the questions provided below the checklist, write a report summarizing your findings, and provide specific citations to each regulation, policy, etc. The results will be discussed in class.

Checklist for Evaluating Local Access Management Programs

	Yes	No	Partly
Does the local comprehensive plan include goals, objectives, and policies that support access management?			
Does the comprehensive plan or major thoroughfare plan classify roadways according to function and level of access control?			
Does the local land development code include a statement of purpose and intent that supports access management?			
Do the plan and code promote activity centers with unified access?			
Does the land development code include regulations for driveway spacing and corner clearance?			
Does the code restrict the number of driveways per lot or parcel on arterials?			

Are new developments encouraged or required to provide interparcel connections (cross access) and joint access?			
Does the code treat properties under the same ownership or those consolidated for development as one property for the purposes of access control?			
Does the land development code include a review process for minor subdivisions or lot splits?			
Does the land development code include restrictions on flag lots?			
Do local subdivision regulations include reverse frontage requirements for residential lots along arterials and collectors?			
Do regulations encourage new development to continue or interconnect with the surrounding street system?			
Do driveway design standards address the following: Driveway throat length? Driveway flare or radius? Driveway width?			

Source: Williams et al. (2014) TRB Access Management Manual, Chapter 8, Exhibit 8-7, as adapted.

Local Program Evaluation Questions

Assessing Local Practices

1. Does the comprehensive plan have goals, objectives, and policies that support access management?

2. Does the transportation element of the comprehensive plan establish a context-sensitive functional hierarchy of roadways? Is the functional classification system adequate for access management purposes?

3. Do land use planning and zoning practices support access management? Are land use planning, subdivision exemptions and lot splits, and commercial (re)zoning practices leading to strip development, or do current practices promote activity centers and unified access systems?

4. How do local land development regulations deal with access issues? Does the code include connection spacing standards, cross-access requirements, outparcel regulations, and so forth?

5. What, if any, driveway design standards are in place? Do driveway design standards appear to be old or outdated? How are decisions made regarding the need for right-turn lanes into developments? When are they required?

6. Are nontraversable medians incorporated into the design of major roadways? Are there standards for median opening spacing and design? Are there policies in place that address the use of medians versus continuous two-way left turn lanes?

7. How is access management dealt with in development review and access permitting? Is there a site plan review process in place for the review of site access and circulation?

Are traffic impact assessment procedures and requirements in place and do they address access management issues?

8. Is there a clear process for addressing requests for deviation from access spacing standards?

9. When the state transportation agency is the permitting authority, how is coordination achieved? Do local government regulations mention and defer to state highway access regulations on the state highway system?

10. Conclude with a summary of the local government's access management policies and procedures and your assessment of its potential strengths and weaknesses based on your review and the readings and guidance your instructor has provided.

B. Quiz Questions

Indicate whether the statement is true (T) or false (F):

1. Administrative rules are procedures and requirements that guide a state agency in carrying out its responsibilities established by law. **True**/False
2. Joint and cross-access regulations typically require separate property owners sharing a common access to enter a maintenance agreement. **True**/False

Fill in the blank:

3. A written law established by a legislative body is a _____
4. A set of procedures and requirements that guide a state agency in carrying out its responsibilities established by law is _____
5. The document that establishes official policies of a local government and its adopted course of action on future land use, transportation, and capital improvements is _____
6. _____ regulations govern the division of land into lots, blocks, and public ways.
7. _____ regulations govern the use of land, as well as the density or intensity of development, parking and loading, lot dimensions, and lot coverage.

(Answers: 3. Statute, 4. Administrative Rules, 5. Comprehensive Plan, 6. Subdivision, 7. Zoning)

Short answer:

8. Driveway permitting is the process used by transportation agencies to enforce access management requirements. Explain the following aspects of effective driveway permitting.

    a) Change in use:

    b) Proof of necessity

c) Conditions

9. What is the role of traffic impact assessment in access management?

C. Example knowledge probe questions for in-class discussion (or quizzes)

1. How do agencies handle existing developed areas that do not meet access management standards?

   Answer: Existing developed areas are "grandfathered" and allowed to continue. However, new development and redevelopment must comply with the new access management standards to the extent feasible. This is similar to how development is handled in zoning when new regulations are adopted.

2. If you must permit access near a signalized intersection, what can you do to reduce the potential safety and operational impacts?

   Answer: It is not uncommon for existing development patterns to preclude the ability to achieve corner clearance requirements. Options include:

   - *Conditions in the permit to restrict volumes of site*
   - *Median to restrict to right in/out only*
   - *Move access to the edge of the property*
   - *Share access with the adjacent site*

Learning Outcomes and Evaluation

Module learning outcomes	Competencies	Suggested Tools	Learning outcomes achieved?*	Notes**
Students are able to list the components of systemwide access management regulations.	☒Knowledge ☐Skills ☐Values ABET (7)	After Class: Muddiest point paper: Ask students to write down the most unclear clear point from the class session. Review responses and address the muddiest points in the next lecture.	☐Yes ☐No	
Students are able to explain the driveway permitting process.	☒Knowledge ☐Skills ☐Values ABET (3,7)	During Class: Module 6 quiz	☐Yes ☐No	
Students are able to evaluate the adequacy of state and local access management policies and procedures.	☒Knowledge ☒Skills ☒Values ABET (4,6)	After Class: Module 6 homework a: State Highway Access Management Policy Audit. Module 6 homework b: Local Agency Access Management Policy Audit. Module 6 knowledge probe questions # and #2	☐Yes ☐No	

**If the learning outcome is not achieved, identify what additional steps are needed to achieve the learning outcome and improve student learning.*

***Identify the areas that are difficult for students and the areas in which students are excelling. Are there other observations?*

Learning Outcome Assessment Rubric

Learning Outcomes	Excellent	Good	Poor
Students are able to list the components of systemwide access management regulations.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to explain the driveway permitting process.	Demonstrates understanding of different levels and methods for different project types	Demonstrates some understanding of different levels and methods for different project types	Demonstrates little understanding of levels and methods for different project types
Students are able to evaluate the adequacy of state and local access management policies and procedures.	Capable of explaining the driveway permitting process in detail.	Capable of explaining some aspects of the driveway permitting process.	Cannot explain the driveway permitting process.

Module Evaluation

Before Module

Please describe your familiarity with the following topics:

Components of systemwide access management regulations.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

The driveway permitting process.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

State and local access management policies and procedures.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

After Module

Think about the topics discussed in this module and how familiar you were with the topics before class. Has your understanding of the topic improved?

Components of systemwide access management regulations

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

The driveway permitting process.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

State and local access management policies and procedures.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Notes

No Notes.

Module 7: Corridor Access Management Plans

This overarching module introduces students to considerations in the development of corridor access management plans and the potential application of access management techniques to a given corridor context. Much of the detailed material is covered in other modules. Materials are provided in Appendix C to support students as they engage in a course project to develop a conceptual corridor access management plan that is completed over a semester.

Applicability

Transportation planning, land use planning, transportation engineering, civil engineering, sustainable transportation.

Subtopics

- Process for development of corridor access management plans
- Data needs for analysis of existing conditions and land use context
- Types of cooperative agreements

Learning Objectives

At the end of this module, students will be able to:

- Identify existing corridor conditions and land use context.
- Develop corridor access management and complete streets concepts.
- Explain how to implement a corridor access management plan.

Readings

Use the list of suggested resources to identify one or more required and/or optional readings for this module.

Florida Department of Transportation, District 5. (2014). Multimodal corridor planning handbook. http://floridatransportationplan.com/planning-studies/GuidanceandHandbooks.htm

Institute of Transportation Engineers. (2011). Planning roadway systems: An ITE recommended practice. Washington, D.C.

Institute of Transportation Engineers/Congress for the New Urbanism. (2010). Designing walkable urban thoroughfares: A context sensitive approach (An ITE Recommended Practice). Washington, D.C.: ITE, 2010. Accessed online: https://www.ite.org/pub/?id=e1cff43c%2D2354%2Dd714%2D51d9%2Dd82b39d4dbad

Williams, K., Stover, V.G. Dixon, K., Demosthenes, P., Broen, F., Brown, L., Huntington, D. Layton, R. and Seggerman, K. (2014). Access Management Manual, 2nd Edition. Transportation Research Board of the National Academies, Washington D.C. (Chapter 10: Corridor Access Management Plans).

Assignments and Activities

A. Homework

a. Corridor Access Management Plan

The objective of this assignment is to provide you with hands-on training in developing a corridor plan with access management components. Consult Chapter 10 of the TRB Access Management Manual (2014) for additional detailed guidance on how to prepare a corridor access management plan. The assignment will be performed in small groups and completed over the course of the semester with two key milestones – the presentation of an interim concept and the presentation and submission of a project report for the final project. Each presentation will be critiqued and evaluated by an expert panel. Ideally, student teams will be multidisciplinary and/or have different complementary skill sets.

Instructions: Use the materials and handouts provided by your instructor to develop a corridor plan with access management components. The handouts contain instructions and key details for completing this assignment.

Note to Instructor: *Materials for these assignments, including instructions, assignment components, final project critique criteria, suggested grading and organization for final reports, a panel evaluation form, and a peer evaluation form, are provided in Appendix C of this guidance document. This project could be designed to integrate multiple steps leading up to the interim and final project. Examples include having students practice developing cross sections using streetmix.com, leading students through a walk audit on the corridor(s), and having students develop detailed purpose and need statements based on their analysis of existing conditions. The corridor(s) evaluated for this project could be assigned by you, selected by students with your approval, and/or one or more corridors could be identified for the project by a community partner with staff and/or planning officials serving as a sounding board or as part of the designated expert panel. Members of local advocacy groups with an interest in transportation could also be engaged in the panel. An example handout to provide panelists for scoring student project presentations is provided at the end of Appendix C. All teams could be assigned the same corridor, or each team could be given a different corridor to evaluate.*

b. Conceptual Access Management Plan

Instructions: Your instructor will provide you with a corridor to evaluate and a link to the state or local access management standards that apply. Students will work in small groups to assess the access characteristics of a corridor and identify possible improvements.

1. Read Chapter 10 of the TRB Access Management Manual (2014) in the readings folder of your course files. Also, consult the applicable state or local access management standards for the assigned corridor.
2. Examine roadway access conditions in relation to the agency standards and supporting street network characteristics using Google Maps for a distance of approximately 1000 feet on either side of the corridor.
    - How many access points are on each side of our one-mile segment?
    - Do access connections, signals, and median openings (if applicable) generally conform to the standards? What are some examples of substandard conditions?
    - Are there areas with good or poor interparcel cross access?

- Is the secondary street network connected and is side street access provided to commercial development? Could the network be improved to provide internal (off-highway) access to corridor properties?
- Is there continuous bicycle, pedestrian, and transit access along the corridor? Or are there gaps in the bicycle and pedestrian network along the corridor or at transit stops?

3. Summarize your observations in a brief (3-4 page) report and include aerial images, photos, conformance with agency standards, and any problems you identified along with some suggestions for improvement.
    - Include a conceptual map of highlights of your analysis and any proposed strategies for improved access management.
    - Identify possible methods of implementation (e.g., don't just say close this driveway, but how might that be accomplished?)

4. Prepare a short presentation to convey highlights of your findings. Be prepared to present your findings to the class.

c. Streetmix Cross-Section Exercise

Instructions: Use Streetmix (**http://streetmix.net/)** to develop at least two new street cross-sections for a more livable, bike/ped-friendly SR 580 in the future. Think about tradeoffs and benefits vs. costs for each cross-section and identify a preferred cross-section. Take a screenshot of your cross-sections, write a short paragraph or a few bullet points describing each cross-section, and explain why you selected your preferred cross-section. Submit your screenshots and description to your instructor.

Given: Existing Condition

- SR 580 is a 6-lane arterial road with a continuous two-way left-turn lane and numerous driveways (not shown)
- Traffic volumes of approximately 44,000 AADT, used for commuting and visitors to the City and beaches and it is a designated evacuation route
- Land use is commercial mixed with suburban residential neighborhoods and the supporting network is disconnected
- Intersections are large and roadway width makes it challenging for pedestrians to cross
- Bicycle lanes are about 4 ft wide on both sides but bicyclists often ride on the sidewalk due to high-speed traffic
- Assume for this assignment that the Right-of-Way (ROW) width is about 150 feet.

Find: Future Cross Section

- Use Streetmix (http://streetmix.net/) to develop a new street cross-section for a greener more sustainable arterial in the future that will serve as a gateway into the City
- Improve overall safety and mobility for all users.
- Think about tradeoffs and benefits vs. costs.
- Final product: a screenshot of your proposed cross-sections with descriptions.

Note to Instructor: This exercise could be assigned to students as an early step toward the interim and final corridor access management plan project or as a separate activity outside of that project. Depending on the course structure, students can complete this assignment individually or as a group. The assignments suggest that students develop at least two cross-sections, instructors may choose to increase the number of cross-sections that students or groups are required to develop for this assignment. You may require students to share their cross-sections with the class in a slide deck.

B. In-Class Activity

a. Corridor Evaluation Exercise

Instructions:

1. Review the corridor evaluation exercise slides in the Module 7 PowePoint:
    - PM Peak Turn Counts
    - Collision diagrams (show the location and number of collisions on the example corridor)
2. The instructor will show you a series of slides with a magnified view of different parts of the study area.
3. Identify the problems and opportunities in each part of the study area.
4. Discuss your findings with the class.
5. The instructor will show the answers on the lecture slides.

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Learning Outcomes and Evaluation

Module learning outcomes	Competencies	Suggested Tools	Learning outcomes achieved?*	Notes**
Students are able to identify existing corridor conditions and context.	☒Knowledge ☒Skills ☒Values ABET (4,6)	During Class: Module 7 homework a: Corridor Access Management Plan - Interim and Final Project presentations and critiques. Module 7 in-class activity a: Corridor Evaluation Exercise After Class: Module 7 homework a: Corridor Access Management Plan (Appendix C) Module 7 homework b: Conceptual Access Management Plan	☐Yes ☐No	
Students are able to develop corridor access management and complete streets concepts.	☒Knowledge ☒Skills ☐Values ABET (1,2,3,4,7)	During Class: Module 7 homework a: Corridor Access Management Plan - Interim and Final Project presentations and critiques. After Class: Module 7 homework a: Corridor Access Management Plan Module 7 homework c: Streetmix Cross-Section Exercise	☐Yes ☐No	
Students are able to explain how to implement a corridor access management plan.	☒Knowledge ☐Skills ☐Values ABET (3,7)	During Class: Module 7 homework a: Corridor Access Management Plan - Interim and Final Project presentations and critiques. After Class: Module 7 homework a: Corridor Access Management Plan	☐Yes ☐No	

**If the learning outcome is not achieved, identify what additional steps are needed to achieve the learning outcome and improve student learning.*

***Identify the areas that are difficult for students and the areas in which students are excelling. Are there other observations?*

Learning Outcome Assessment Rubric

Learning Outcomes	Excellent	Good	Poor
Students are able to identify existing corridor conditions and context.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to develop corridor access management and complete streets concepts.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to explain how to implement a corridor access management plan.	Capable of explaining a variety of implementation strategies.	Capable of explaining some implementation strategies.	Incapable of explaining any implementation strategies.

Module Evaluation

Before Module

Please describe your familiarity with the following topics:

Identifying existing corridor conditions and land use context.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

Developing corridor access management and complete streets concepts.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

How to implement a corridor access management plan.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

After Module

Think about the topics discussed in this module and how familiar you were with the topics before class. Has your understanding of the topic improved?

Identifying existing corridor conditions and land use context.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Developing corridor access management and complete streets concepts.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

How to implement a corridor access management plan.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Notes

No Notes.

Module 8: Legal Considerations in Access Management

This module reviews legal considerations in the application of access management techniques. It introduces students to the distinction between police power and eminent domain, and reviews sources of legal authority for agency access management programs, legal guidelines from case law on the implementation of access management techniques, and considerations in administering access management programs to ensure legal viability.

Applicability

Transportation planning, land use planning, transportation engineering, civil engineering, land use law, transportation law.

Subtopics

- Police power versus eminent domain
- Sources of legal authority to manage highway access
- Common legal considerations in access management (e.g., reasonable access, a left is not a right, etc.)

Learning Objectives

At the end of this module, students will be able to:

- Describe the difference between police power and eminent domain
- Summarize important legal considerations related to the application of access management
- Explain how a regulatory process can impact the legal viability of an access management program

Readings

Use the list of suggested resources to identify one or more required and/or optional readings for this module. Starred readings are especially recommended.

Covey Jr., F, (1959) Control of highway access. 38 Neb. L. Rev. 407. https://digitalcommons.unl.edu/nlr/vol38/iss2/4

Dixon, K., R. Layton, M. Butorac, P. Ryus, J.L. Gattis, L. Brown, and D. Huntington. (2016). Access management application guidelines. Transportation Research Board of the National Academies, Washington, D.C. (Chapter 6: Legal Authority for Access Management)

Huntington, D., and J. Wen. (2005). NCHRP synthesis 351: Access rights. Transportation Research Board of the National Academies, Washington, D.C.

National Cooperative Highway Research Program. (2009). Selected studies in transportation law, Volume 2, “Eminent Domain, Section 2, Impairment of Access and Just Compensation”.

Netherton, R. D. (2000). NCHRP legal research digest 44: Reexamination of the line between governmental exercise of the police power and eminent domain. Transportation Research Board, National Research Council, Washington, D.C.

Stokes, M. (2012) Access management: Balancing public and private rights in the modern "commons" of the roadway. 60 Clev. St. L. Rev. 585. https://engagedscholarship.csuohio.edu/clevstlrev/vol60/iss3/5 *

Williams, K., Stover, V.G. Dixon, K., Demosthenes, P., Broen, F., Brown, L., Huntington, D. Layton, R. and Seggerman, K. (2014). Access management manual, 2nd Edition. Transportation Research Board of the National Academies, Washington D.C. (Chapter 12: Right of Way and Access Control).*

Selected Caselaw:

1. *Nollan v. California Coastal Comm'n*, 483 U.S. 825, 107 S.Ct. 3141, 97 L.Ed. 2d 677, (1987)
2. *Dolan v. City of Tigard*, 114 S.Ct. 2309, 129 L.Ed 2d 304, 62 U.S.L.W. 4576, (1994)
3. *Armstrong v. United States*, 364 U.S. 40, p. 49, (1960)
4. *First English Evangelical Lutheran Church of Glendale v. County of Los Angeles, 107 S.Ct. 2378, 96 L.Ed. 2d 250 (1987).*
5. *Florida Department of Transportation and Pinellas County v. ABS Inc, 336 So. 2d 1278 (Fla. App. 1976).*
6. *State Dept. of Highway v. Davis, 626 P.2d 661 (Colo. 1981) and State Dept*. of Highway v. Interstate-Denver West, 791 P.2d 1119 (Colo. 1990).
7. *Florida Department of Transportation v. Capital Plaza, Inc*., 397 So.2d 682 (Fla. 1981)
8. *Palm Beach County v. Tessler*, 538 So.2d 846 (Fla. 1989).

Assignments and Activities

A. Homework

a. Case Law Summary

Instructions: Download these cases *Palm Beach County v. Tessler*, 538 So.2d 846 (Fla. 1989) and *Florida Department of Transportation v. Capital Plaza, Inc*., 397 So.2d 682 (Fla. 1981). Briefly summarize the salient facts of each case and the key findings of the court and their implications for access management practice. Be prepared to discuss your answers in the next class session.

b. Statutory Authority Essay:

Instructions: Identify and list the statute that conveys authority to regulate access management in your state (the state in which your college or university is located) and in two other states. Next, organize your responses under the following questions:

- What public purposes are identified in the statutes?
- What authority do the statutes convey to states and any other agencies referenced?
- Do the states differ in terms of the authority provided to them to regulate access? How so?

A. In-Class Activity:

a. **Police Power versus Eminent Domain:**

Instructions: Define police power and eminent domain and describe the distinction between the two concepts. Provide one to two examples of each term in the context of access management. Share the definitions, distinctions, and examples with the other students in your class and ask if they agree with your definitions or if they would define these terms and their distinctions differently. Discuss the commonalities and differences in how you each conceptualize these terms.

B. Quiz Questions:

a. Indicate whether the statement is true (T) or false (F)

a) Primary authority over land development decisions in the U.S. lies with state transportation agencies. True/**False**

b) When installing a raised median on an undivided roadway, government agencies must compensate property owners for the loss of left-turn access. True/**False**

c) Eminent domain is the right of the government to take private property for public use without compensating the property owner. True/**False**

b. Which of the following actions is most representative of a government agency's use of police power for access management?

a) Denial of a permit request for direct highway access to a new business, while allowing access from a side street.

b) Closing direct highway access to an existing business to build a limited access highway, with full compensation to the property owner for the loss of access.

c) Replacing a full median opening with a directional opening to improve roadway safety and operations.

d) None of the above.

G. Example knowledge probe questions for in-class discussion (or quizzes)

1. Discuss the following legal concepts and how they relate to the practice of access management.

a) Reasonable Access

b) Tort Liability

c) Proof of Necessity

2. What are some sources of authority that agencies rely on when administering access management?

3. How might an agency's approach to administering variances from access spacing standards help or undermine an access management program?

Learning Outcomes and Evaluation

Module learning outcomes	Competencies	Suggested Tools	Learning outcomes achieved?*	Notes**
Students are able to describe the difference between police power and eminent domain.	☒Knowledge ☐Skills ☒Values ABET (3,7)	<u>During Class</u>: Module 8 in-class activity a: Police Power versus Eminent Domain	☐Yes ☐No	
Students are able to summarize important legal considerations in the application of access management.	☒Knowledge ☒Skills ☒Values ABET (3,4)	<u>During Class</u>: Module 8 knowledge probe questions. Module 8 quiz <u>After Class</u>: Module 8 homework a: Case Law Summary	☐Yes ☐No	
Students are able to explain how a regulatory process can impact the legal viability of an access management program.	☒Knowledge ☐Skills ☒Values ABET (3,4)	<u>During Class</u>: Module 8 knowledge probe questions. <u>After Class</u>: Module 8 homework a: Case Law Summary Module 8 homework b: Statutory Authority Essay	☐Yes ☐No	

**If the learning outcome is not achieved, identify what additional steps are needed to achieve the learning outcome and improve student learning.*

***Identify the areas that are difficult for students and the areas in which students are excelling. Are there other observations?*

Learning Outcome Assessment Rubric

Learning Outcomes	Excellent	Good	Poor
Students are able to describe the difference between police power and eminent domain.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to summarize important legal considerations in the application of access management.	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to explain how a regulatory process can impact the legal viability of an access management program.	Capable of explaining how processes can reduce or increase legal risk to an agency.	Capable of partially explaining how processes can reduce or increase legal risk to an agency.	Incapable of explaining how processes can reduce or increase legal risk to an agency.

Module Evaluation

Before Module

Please describe your familiarity with the following topics:

The difference between police power and eminent domain.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

Important legal considerations in the application of access management.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

How a regulatory process can impact the legal viability of an access management program.

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

After Module

Think about the topics discussed in this module and how familiar you were with the topics before class. Has your understanding of the topic improved?

The difference between police power and eminent domain.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Important legal considerations in the application of access management.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

How a regulatory process can impact the legal viability of an access management program.

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Notes

No Notes.

Module 9: Public Involvement in Access Management

This module addresses issues that arise with transportation projects and programs that impact roadway access and strategies for identifying and working with stakeholders. It examines potential sources of tension in access management among different stakeholder groups, and how to determine the appropriate level of outreach and communication strategies for typical public concerns. Important "do's" and "don'ts" when working with the public on access management are also covered.

Applicability

Public involvement, transportation planning, transportation engineering, civil engineering, highway design, public administration.

Subtopics

- Typical sources of public tension relative to projects and policies that impact roadway access
- "Do's" and "don'ts"
    - Establish a fair, open, and continuous process.
    - Never try to slip a controversial decision past the public.
    - Build networks and keep the lines of communication open.
    - Listen and restate—seek to understand public concerns clearly.
    - Avoid hasty concessions or commitments.
    - Take advantage of design flexibility to accommodate stakeholder requests
    - Keep thorough records and memorialize agreements
- Determining appropriate levels of outreach
    - Passive (background information online, mailers)
    - Individual contacts (one-on-one meetings)
    - Active outreach program (presentations, press releases, etc.)
    - Stakeholder involvement in decision-making
    - Formal public involvement process (ongoing process using multiple methods for large projects or major policy initiatives)
- Techniques for meaningful public involvement in access management
- Specific communication strategies (for public meetings)

Learning Objectives

At the end of this module, students will be able to:

- Explain the do's and don'ts of effective public involvement
- Choose an appropriate level of public outreach for a specific project or decision
- Identify appropriate involvement techniques
- Apply communication strategies to address common stakeholder concerns

Readings

Use the list of suggested resources to identify one or more required and/or optional readings for this module. Starred readings are especially recommended.

Dixon, K., Layton, R., Butorac, M., Ryus, P., Gattis, J.L., Brown, L. and Huntington, D. (2016). Access management application guidelines. Transportation Research Board of the National Academies, Washington D.C. (Ch26: Effective Communication Strategies for Access Management)

Dixon, K., Hibbard, J., and Mroczka, C. (1999) Public perception of median treatment for developed urban roads. TRB Circular E-C019: Urban Street Symposium. https://onlinepubs.trb.org/onlinepubs/circulars/ec019/Ec019_c4.pdf

Federal Highway Administration. (2024 *in progress*). Safe access is good for business video and primer.

Florida Department of Transportation. (2016). Access management: Answers to your business questions. https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/systems/systems-management/programs-services/access-management/am2016brochure.pdf?sfvrsn=431a6ca0_0

U.S. Department of Transportation. (2022). Promising practices for meaningful public involvement in transportation decision-making. https://www.transportation.gov/priorities/equity/promising-practices-meaningful-public-involvement-transportation-decision-making

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Assignments and Activities

A. Homework

a. Public Involvement Plan

Instructions: Your instructor will divide you and your classmates into groups. Review the example project description provided by your instructor. Complete the public involvement plan questions. Share your responses with other members of your group and expand your answers as necessary. Work as a group to complete the group exercise developing a list of objectives for the public involvement process, identifying strategies to address the objectives, and sharing the objectives and strategies in class.

Project Description:
Replacing a two-way left turn lane with a non-traversable median.
Your transportation agency plans to improve Broad Avenue, a major arterial in Acme, Florida. The 4-lane roadway with a continuous two-way left-turn lane (TWLTL) is congested during morning and evening rush hour, and left turns become difficult at those times. The objective of your agency is to replace the TWLTL with a non-traversable median and some roundabouts at intersections. Improved safety is your agency's primary objective. You have been scanning the local newspaper to learn more about the area. A recent news article noted that the City Council is concerned about the decline of the business district that abuts the roadway and the deteriorating appearance of the corridor. One of the Council members hopes to beautify the

corridor with landscaping and sidewalk improvements, but she has not yet identified a funding source. The area was recently designated as a Community Redevelopment Area (CRA) and the CRA Director is working with business owners on an economic revitalization plan. Two of the businesses recently were forced to close and the CRA is looking for potential new tenants. There was another article in the same paper describing a recent crash on the road involving a pedestrian, who was killed by a turning vehicle while crossing the road.

Individual Exercise: Answer the following questions:

1. In your opinion, what are going to be the main issues surrounding the project?
2. Who are some of the primary stakeholders (public and private)?
3. What level of involvement would you propose for the project?
4. What key messages do you want to convey to this audience at your first public meeting?
5. What are two questions you will likely be asked at your first public meeting and how will you answer them?

Group Exercise: Work as a group to complete the following exercises:

1. Develop a brief list of objectives for the public involvement process.
2. List at least three strategies or techniques you might use to fulfill these objectives.
3. Select someone from your group to briefly describe your objectives and strategies to the class when you complete the exercise.

b. Public Meeting Summary

Instructions: Attend a meeting of a transportation agency or community organization or any public meeting where a transportation project involving access changes or access-related policies is being discussed and prepare a summary memo of the meeting highlights. The memo should identify those present, summarize key items discussed, and note any decisions and next steps identified. It should be approximately 4 pages single-spaced and written as if one were developing a staff report to brief one's agency or division director. This assignment is due before the end of the semester and will require early planning as agencies have various meeting schedules and may meet during the day or at night. Examples include, but are not limited to public meetings or hearings of:

- State DOTs
- MPOs or MPO Committees
- Transportation Authorities
- Transit agencies
- Neighborhood associations
- Hillsborough County Aviation Authority
- Port Authorities
- Local government Council or Commission meetings
- Meetings of a transportation-related advocacy group

c. Read and Reflect: Median Guidelines – Case Study: State Street Widening (Utah)

Instructions: Read the case study on State Street in Sandy City, Utah, and answer the following questions. Discuss the responses in class.

Link to the Case Study on State Street in Sandy City, Utah:
https://www.udot.utah.gov/raisedmedians/images/Resources/Case%20Studies/Median%20Guidelines%20Case%20Study%20-%20State%20Street.pdf

Case Study Questions: Answer the following questions:

- What strategies did the project staff use to work with the business owners and reduce controversy surrounding the project?
- Why were those strategies effective?

d. Public Involvement Role Play Activity

The objective of this assignment is to help students understand the issues that arise when working with the public. It gives students an opportunity to practice various communication strategies.

Instructions: Use the materials and handouts provided by your instructor to participate in the role-play exercise. Your instructor will assign a role to you. Read the sketch for your character and be prepared to act out your role. You may expand upon your character and his/her concerns but try to keep within the facts you were given.

Note to Instructor: Materials for these assignments, including instructions, the public meeting notice, and character sketches, are provided in Appendix D of this guidance document. The public information specialist will facilitate the public meeting for this assignment, you can intervene as much or as appropriate for this assignment, or you can assume the role of the public information specialist.

H. Example knowledge probe questions for in-class discussion (or quizzes)

1. What are some common mistakes agencies make when they attempt to involve the public?
2. What are some common public concerns that might arise when an agency proposes to install a median or close median openings?
3. Explain how the level of involvement might differ between a project to install a new median and a project to close an existing median opening.

Learning Outcomes and Evaluation

Module learning outcomes	Competencies	Suggested Tools	Learning outcomes achieved?*	Notes**
Students are able to explain the do's and don'ts of public involvement	☒Knowledge ☐Skills ☒Values ABET (3,4)	<u>During class</u>: Module 9 knowledge probe questions #1 & #2 <u>After Class</u>: Module 9 homework b: Public meeting summary	☐Yes ☐No	
Students are able to choose an appropriate level of public outreach for a specific project or decision.	☒Knowledge ☒Skills ☒Values ABET (3,4,6)	<u>During Class</u>: Module 9 homework a: Public Involvement Plan. Module 9 knowledge probe question #3.	☐Yes ☐No	
Students are able to identify appropriate public involvement techniques.	☒Knowledge ☒Skills ☒Values ABET (3,4)	<u>After Class:</u> Module 9 homework c: Read and Reflect Case Study	☐Yes ☐No	
Students are able to apply communication strategies for typical public concerns	☒Knowledge ☒Skills ☒Values ABET (3,4)	<u>During Class</u>: Module 9 homework d: Public Meeting Role Play	☐Yes ☐No	

**If the learning outcome is not achieved, identify what additional steps are needed to achieve the learning outcome and improve student learning.*

***Identify the areas that are difficult for students and the areas in which students are excelling. Are there other observations?*

Learning Outcome Assessment Rubric

Learning Outcomes	Excellent	Good	Poor
Students are able to explain the do's and don'ts of public involvement	Displays a deep and nuanced understanding	Displays an adequate understanding	Conveys little understanding
Students are able to choose an appropriate level of public outreach for a specific project or decision	Demonstrates understanding of different levels and methods for different project types	Demonstrates some understanding of different levels and methods for different project types	Demonstrates little understanding of levels and methods for different project types
Students are able to identify appropriate public involvement techniques.	Thoroughly understands appropriate public involvement techniques, and is able to justify their use in various contexts.	Can identify some public engagement techniques, but may not be able to adequately justify their use in different contexts.	Cannot identify public engagement techniques or cannot justify their use in any context.
Students are able to apply communication strategies for typical public concerns	Capable of restating most communication strategies.	Capable of restating some communication strategies.	Cannot restate the communication strategies.

Module Evaluation

Before Module

Please describe your familiarity with the following topics:

"Do's" and "don'ts" of public involvement

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

Identifying appropriate levels of outreach

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

Public involvement techniques

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

Specific communication strategies to address stakeholder concerns

- ◯ No prior knowledge
- ◯ Beginner
- ◯ Intermediate
- ◯ Expert

After Module

Think about the topics discussed in this module and how familiar you were with the topics before class. Has your understanding of the topic improved?

"Do's" and "don'ts" of public involvement

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Identifying appropriate levels of outreach

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Determining appropriate levels of outreach

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Public involvement techniques

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Specific communication strategies to address stakeholder concerns

- ◯ No, it is the same. I know just as much as I knew before class.
- ◯ Yes, it improved a little. I understand the topic a little better, but still have a lot of questions.
- ◯ Yes, it improved significantly. I understand the topic more, and I am confident in my knowledge.

Notes

No Notes

References

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Appendix A. Functional Area Assessment

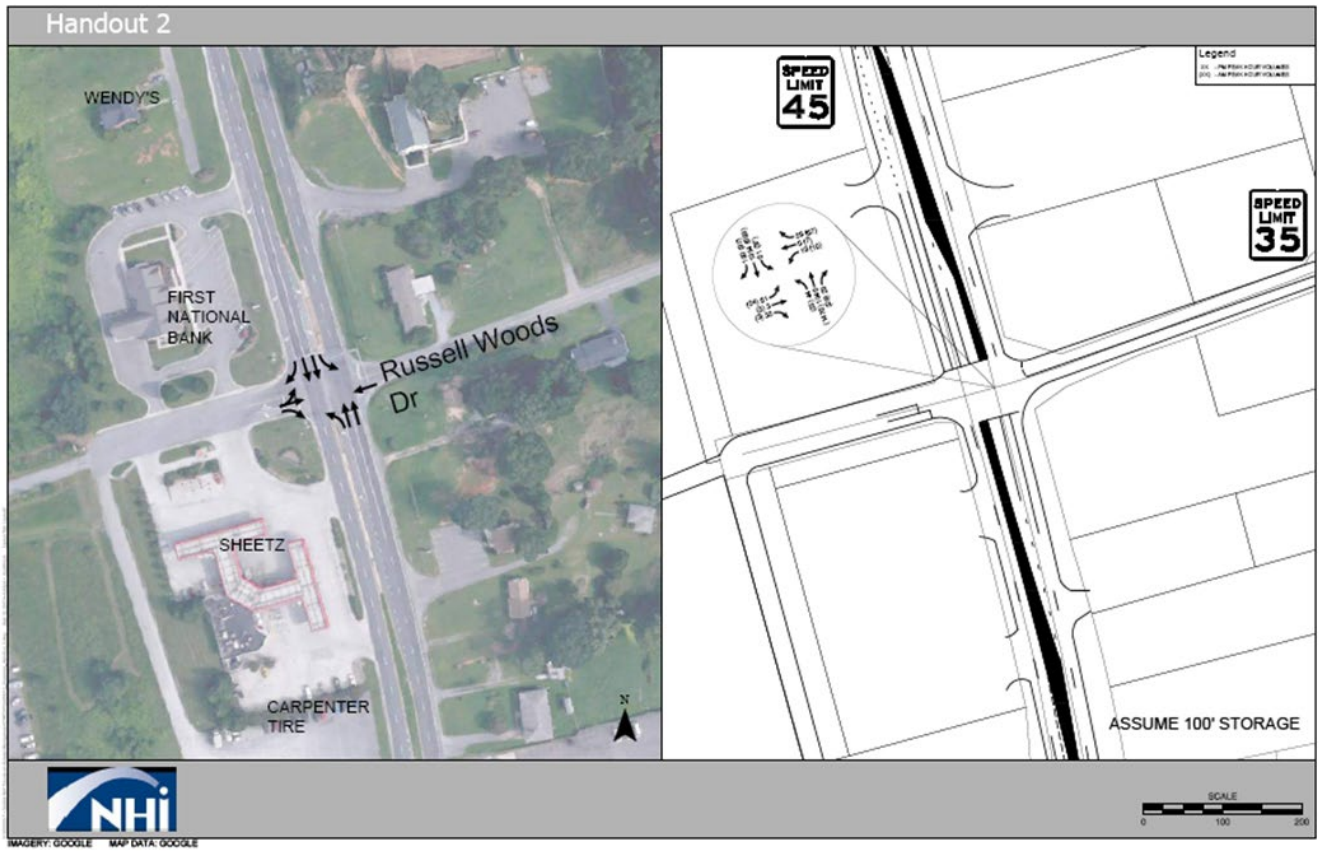
Objective: The purpose of this activity is to help you understand how to measure upstream and downstream functional intersection distance and identify access connections that are within the functional area.

Directions: Review the aerial image and map provided in the handout (also provided in the Module 4 PowerPoint). Measure the upstream and downstream functional areas of the intersection in the provided map and use the table provided by your instructor (see next page) to complete the following:

- Document the functional distance for D1 and D2 (assume 100' for D3).
- Identify access connections within the functional area.

Discuss your findings:

- Describe the characteristics of the upstream and downstream functional areas.
- How many access connections are within the functional area?
- What are the safety and capacity implications of these characteristics and access connections?
- Why is it important to protect the intersection functional area?



Source: NHI Course 133078 Access Management: Solutions for All Users

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	Functional Distance	Connections
Northbound Upstream		
Northbound Downstream		
Southbound Upstream		
Southbound Downstream		
Eastbound Upstream		
Eastbound Downstream		
Westbound Upstream		
Westbound Downstream		

Source: NHI Course 133078 Access Management: Solutions for All Users

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Appendix B. Auxiliary Lane Assessment

Objective: The purpose of this activity is to help you understand the rationale for requiring auxiliary lanes and identify locations where auxiliary lanes are warranted.

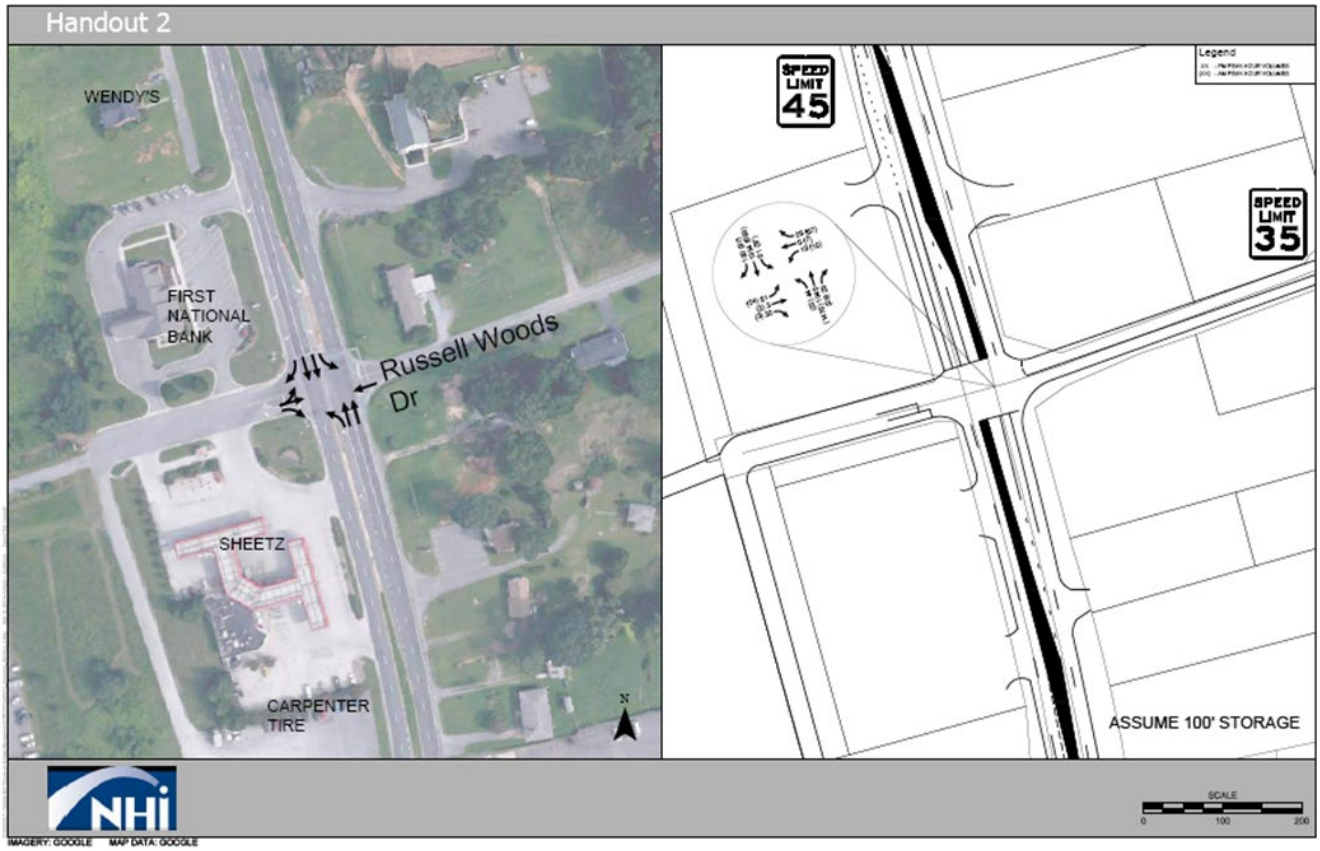
b. Directions: Review the aerial image and map provided in the handout (also provided in the Module 5 PowerPoint).

- Identify the factors that are considered in the warranting of the auxiliary lane.
- Review the aerial image and map provided in the handout (and on the next slide) and complete the following:
  - Identify locations where auxiliary lanes are needed by volume warrants and benefit/cost analysis.
    - Note: Assume an even distribution of traffic in all lanes and 45 mph on US -29 and 35 mph on the intersecting roadway.

Discuss your findings:

a. Does the addition of auxiliary lanes create any challenges in spacing adjacent connections?

b. How might the addition of the auxiliary lanes influence safety and traffic flow?



Source: NHI Course 133078 Access Management: Solutions for All Users

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Appendix C. Corridor Access Management Plan: Interim and Final Project

Due: (date, time) (PowerPoint and electronic file of Handout. Bring copies of the handout to class for the expert panel and one copy of the final project report for your instructor)

Note to Instructor: *This project could be designed to integrate multiple steps leading up to the interim and final project. Examples include having students practice developing cross sections using streetmix.com, leading students through a walk audit on the corridor(s), and having students develop detailed purpose and need statements based on their analysis of existing conditions. The corridor(s) evaluated for this project could be assigned by you, selected by students with your approval, and/or one or more corridors could be identified for the project by a community partner with staff and/or planning officials serving as a sounding board or as part of the designated expert panel. Members of local advocacy groups with an interest in transportation could also be engaged in the panel. An example handout to provide panelists for scoring student project presentations is provided at the end of the Appendix. All teams could be assigned the same corridor, or each team could be given a different corridor to evaluate. Module 7 homework assignment b: Conceptual Access Management Plan is a shorter assignment focused specifically on access management conditions and concepts that could be assigned leading up to the interim and final project presentations. Similarly, Module 7 homework assignment c: Streetmix Cross-Section Exercise provides a cross-section exercise that could be assigned separately from this larger project and early in the course to familiarize students with the Streetmix tool and its application.*

Objective

The objective of this assignment is to provide you with hands-on training in developing a corridor plan with access management components. Consult Chapter 10 of the TRB *Access Management Manual*, second ed. (2014) for additional detailed guidance on how to prepare a corridor access management plan. The assignment will be performed in small groups and completed over the course of the semester with two key milestones – the presentation of an interim concept and the presentation and submission of a project report for the final project. Each presentation will be critiqued and evaluated by an expert panel. Ideally, student teams will be multidisciplinary and/or have different complementary skill sets.

Corridor access management concepts should consider the potential for redevelopment and changes to land use and street design, including concepts related to complete streets, emerging technology, and green infrastructure. Students must consider the needs of multiple modes and corridor conditions, including available right-of-way, traffic volumes, land use and redevelopment potential, access management/supporting street network, modal (transit, bicycle, pedestrian) facilities, safety, operations, and aesthetics. A goal is to achieve a more sustainable, equitable, and resilient corridor that advances economic vitality.

1. **Interim**: **Develop concept(s) for the interim critique.** About halfway through the course, each student team will present your interim findings and initial proposals for your transportation corridor based on your evaluation of the corridor, consideration of access needs and alternatives, and proposed planning and conceptual design concepts.

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2. **Final**: **Present the final project.** At the end of the course, each student team will present your complete findings and initial proposals for your transportation corridor based upon your evaluation of the corridor, consideration of access needs and alternatives, and proposed planning and conceptual design concepts, as well as an implementation plan that includes policy, financial, and regulatory components.

Overview

The class has been asked to conduct a corridor access management study and prepare the following:

1. Inventory and analysis of corridor conditions, transportation, land use, and policy/financial context (including a purpose and need statement for the corridor, example access management and related goals and objectives, and identification of the corridor land use context);
2. Corridor access management and complete streets concepts (alternative complete street cross-section concepts, access management and network planning concepts, land use/urban design concepts, and others as appropriate). Keep in mind that funding for improvements is limited so ideas that are cost effective and adaptable have a better chance of being implemented.
3. Implementation strategies, policies, and regulations to advance the corridor concepts.

NOTE: While all three of the above items must be addressed for the final project, only work conducted to date must be addressed in the interim critique. Groups will have the opportunity to change their final project based on input received during the interim critique.

Requirements

All corridor access management and complete streets concepts presented must be feasible and reflect goals and objectives set by each group that builds upon a purpose and need statement and context assessment. In addition to what is listed above, below are a few points that need to be considered:

Safety – Documentation of and sensitivity to historic bicycle, pedestrian, and vehicular crash locations and severities and consideration of the safety implications of alternative access management plans.

Travel Demand – design concepts should accommodate existing and future anticipated travel demand. Assumptions can be made about how vehicle trips would be shifted to other modes (thereby reducing peak hour volumes) with adequate justification and associated corridor management and demand management measures.

Right-of-Way- All roadway design concepts should generally fit within existing public right-of-way. Some additional rights-of-way may be proposed for acquisition at intersections where a case can be made for financial feasibility.

Appropriate Standards- All designs must generally follow appropriate access management and design standards. Keep in mind we are developing design *concepts*, and it is not necessary to worry about every single design aspect. Just ensure that key items (i.e., median widths, lane widths, crosswalk widths, total number of lanes, etc.) are consistent with set standards. If you are recommending unique design items that are not addressed in local agency standards, then follow standards or guidance from an equivalent agency or another professionally accepted source (e.g., NACTO, AASHTO).

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Implementation Strategies –identify implementation measures based on your proposals and the literature and select some policy, regulatory, and design measures that you would implement on our corridor (and possibly citywide) at the local level and state level (if it is a state-maintained corridor). These access management measures may relate to land use and urban design, network planning and connectivity, alternative intersection design, and other measures as appropriate.

Any applicable government agency plans, policies, and regulations at the state, regional, and local levels should be taken into account. See the local government land development code for insights into implementation strategies that may or may not already be in place. Most local agencies post their code at municode.com.

Context Assessment Worksheet

1. Familiarize yourself with the questions in the context assessment worksheet on pages 33 and 34 of the FDOT District 5 Multimodal Corridor Planning Handbook. The full handbook may be downloaded at http://floridatransportationplan.com/planning-studies/GuidanceandHandbooks.htm
2. Prepare a Context Assessment Worksheet that will serve as a data collection plan for your final project. Use the format in the Multimodal Corridor Planning Handbook and refer to other resources provided by your instructor for additional guidance.
3. Identify key types of data and information you plan to collect to better understand the transportation, land use, and policy and financial context of your study corridor. Note how/where to acquire the information (e.g., actual documents, data sources, agencies/individuals to contact).
4. Keep in mind the many state, regional, local, and modal agencies that may have information of importance to the corridor. Sources of information on stakeholder views may include public meeting minutes and the media.

Interim Critique

The interim project involves your initial analysis of conditions on the existing route and preliminary identification of corridor concepts. Identify supporting data still needed (i.e., photos, projected volumes, etc.) that will be used to develop the final future access management and design concept. Project teams should work together on a data collection plan established in your context assessment worksheet to minimize duplication in data gathering. Begin developing these group work products for the final project, and complete as many as possible by the interim session:

Project Area Assessment -Your group should review the project area and agree among yourselves on the land use context and purpose and need. Develop a full context assessment worksheet (see Section G below) related to your project area and the larger planning area to serve as a data collection plan. Identify key needs based on the data and findings. Develop a photo inventory of existing conditions that identify issues to be addressed and areas for improvement.

Goals, Objectives, and Performance Measures – Building on your purpose and need assignment, your group will identify one or two overall goals with two or three supporting objectives for each goal that will guide the development of your concepts. If possible, your objectives should be measurable. Make sure you understand the difference between goals and objectives. Document your goals and objectives

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in a handout and in PowerPoint. Identify performance measures to evaluate your progress toward achieving these goals and objectives.

Land Uses and Activity Centers - Identify the generalized land use plan and any main activity centers in the planning area that are relevant to the project.

Modal Facilities and Connectivity – Identify key facilities, their points of access to the corridor, and paths of connectivity for different mobility modes.

Sketch-Level Scenarios – Explore creative ideas for addressing goals and objectives by developing a few sketch-level scenarios for land use, access management, and modal connectivity. These will be first drafts and should be shown in the handout and PowerPoint.

(Optional) Complete Streets Design Concept – Though not required at this time, the group may want to give some thought to a final design concept that will include future land use changes at this time.

Final Product: PowerPoint presentation and handout for the expert panelists with the above items. Be sure any design concepts in the handout are large enough to be clearly visible in the handout.

Final Critique

The final project involves your analysis of the existing route and identification of corridor management and design concepts. Develop these group work products for the final project:

Project Area Context Assessment – Your group should once again review the project area and agree among yourselves on the context classification and the data collected in your context assessment worksheet related to your project area and the larger planning area. Identify key needs based on the data and findings. Develop a photo inventory of existing conditions that identify issues to be addressed and areas for improvement.

Goals and Objectives to Be Achieved – Building on your purpose and need, your group will identify one or two overall goals with two or three supporting objectives for each goal that will guide the development of your concepts. If possible, your objectives should be measurable. Make sure you understand the difference between goals, which are longer term and visionary, and objectives, which are measurable.

Land Uses and Activity Centers – Identify the generalized land use plan and any main activity centers in the planning area that are relevant to the project.

Modal Facilities and Connectivity – Identify key facilities, their points of access to the corridor, and paths of connectivity for different mobility modes.

Sketch-Level Scenarios – Explore creative ideas for addressing goals and objectives by developing a few sketch-level scenarios for land use, access management, and modal connectivity. These should be shown in the report and PowerPoint.

Complete Streets Design Concept – Provide a long-range design concept that will also reflect future land use changes.

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Implementation Strategies – strategies, policies, and regulations to advance the corridor access management and design concepts.

Final Product: PowerPoint presentation and handout including all slides in the final presentation.

NOTE: The report must be formatted consistent with guidelines and templates provided by your instructor, include figures and tables, and provide specific references (APA style) in support of all findings and recommendations. Grading and organization guidelines for group final project reports are provided in section F.

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Grading and Organization for Final Group Project Reports

TOTAL SCORE for Final Project Presentation and Report 100 pts.

1. Title page – Must include: *title, due date, your name,* and the *instructor's name*. Also include *group numbers based on the order of presentations from the interim project, group leader,* and *members of the group*.

2. Table of Contents – A Table of Contents must be included, with the page numbers accurately labeled.

3. List of Tables, Figures, and Appendices – A list of Tables, Figures, and Appendices must be included, with the page numbers accurately labeled (can be on the same page as the Table of Contents).

4. Introduction – Briefly describe the nature of the project study, the questions being addressed, and what you did (Minimum one page). State the purpose and need for the study and your goals and objectives for the corridor.

5. Findings and Proposals – Present your results in summarized and easy-to-follow form, using tables and charts as appropriate. Make paragraphs, normally not longer than a quarter page, headed by a clear title. In this section, you should answer key questions that need to be addressed. Include details of your existing conditions analysis that guided your analysis and any limitations of the available data. For corridor management and complete streets concepts provide your findings relative to the various assessments, the results of your analysis, and discuss what the results indicate. Use figures and tables to convey key issues identified. Identify any trade-offs with regard to design proposals. *All Figures, Tables, and Appendices need a title, must be labeled with a Figure, Table, or Appendix number, and be referenced in the text*. All figures and tables not prepared by you must be sourced. Table captions are above tables and in title case, whereas figure captions are below figures and in sentence case. All axes and units must be labeled. Failure to follow this format will result in grading penalties.

6. Conclusions and Recommendations – Provide a summary of conclusions and recommendations regarding the implementation of your project proposals, including strategies and example policies and/or regulations. (Generally one page)

7. Sources – In "references" you cite a specific source with page numbers about a specific topic and the citation is provided in the text. In "bibliography" you mention sources that were generally consulted in your work and apply to your topic and these need not be cited in the text. All final reports must have complete citations of the sources used per the APA (American Psychological Association) referencing guide: http://owl.english.purdue.edu/owl/resource/560/01/ Websites should have a remark such as "accessed on (date)".

8. Glossary – Explanation of main terms, as needed.

9. Final Page – Each report must contain a statement about contribution to *the entire final project work* (data collection, ideas, graphics, presentation, etc.) signed by all group members indicating:

I certify that I have contributed the following share of total work for the project:

Signature	Percent of work
_____	xx%

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Evaluation Form for Interim and Final Corridor Plan Project Presentations

(Interim or Final) Student Project Presentations
(date)

Group #:_____ Name of Panelist: _____

Grading Category	**Possible Points**	**Rating**
Presentation Content (max. 70 pts.):		
-Context Assessment and Existing Conditions	10	_____
- Goal(s) (1-2) and (2-3) Objectives	10	_____
- Sketch Level Scenarios:		
Land Use and Activity Centers	5	_____
Modal Connections/Network/Access Mgt	5	_____
- Short Range Street/LU Design Concepts & Strategies	20	_____
- Long Range Street/LU Design Concepts & Strategies	20	_____
Presentation Quality (max 30 pts.):		
- Delivery and organization	15	_____
- Quality of visuals	15	
	Max: 100	**Total:**

Panelist Comments:

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A total of more than 70 points is a passing grade for the Final Presentation.

Panelist Rating: **Pass** / **Fail**

Thanks to the students and panelists for your work!

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Peer Evaluation Form for Group Work

Your name _____

Write the name of each of your group members in a separate column. For each person, indicate the extent to which you agree with the statement on the left, using a scale of 1-4 (1=strongly disagree; 2=disagree; 3=agree; 4=strongly agree). Total the numbers in each column.

Evaluation Criteria	**Group member:**	**Group member:**	**Group member:**	**Group member:**	**Group member:**
Attends group meetings regularly and arrives on time.					
Contributes meaningfully to group discussions.					
Completes group assignments on time.					
Prepares work in a quality manner.					
Demonstrates a cooperative and supportive attitude.					
Contributes significantly to the success of the project.					
TOTALS					

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Appendix D. Public Meeting Role Play

A. Public Meeting Role Play

Objective: Understand issues that arise when working with the public on access management projects and practice communication strategies.

Directions: This is a role-playing exercise. Below is a notice of a public meeting that you received in the mail. On the reverse side of this page, is your role. Please read the public meeting notice and then read the character sketch on the reverse side. Be prepared to act out your role. You may expand upon your character and his/her concerns but try to keep within the facts you were given. The Public Information Specialist will tell you when it is time for the public meeting.

Public Meeting Notice

Broad Avenue Improvement Project

Thursday, March 25, 2004

City Hall

Room 100

6:00 p.m.

The Department of Transportation is about to begin a project development study aimed at solving traffic safety and mobility problems on Broad Avenue. Broad Avenue is highly congested during the morning and evening peak periods and has a high vehicular crash rate, with several bicycle-pedestrian crashes in the past year. The project will consider a variety of alternatives, including different types of mid-block pedestrian crossings, and a combination of solutions such as closing median openings, adding turn lanes at median openings, adding lanes, reconstructing site access, and redesigning intersections. To learn more about the Broad Avenue project, a public meeting and open house have been scheduled for **{date of class} at City Hall** downtown.

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DOT Project Manager

You are the project manager for the project and have worked at the Department of Transportation for ten years. Your public information specialist has scheduled an open house and public meeting to obtain citizen input on your project. Your role is to explain the problem on Broad Avenue and obtain comments or answer questions about the study. The DOT has not decided yet what it will do and is only beginning the study the problem. However, you secretly want to close as many median openings as you can, because you know the access spacing is currently substandard. You also don't want any trees or special landscaping in the median because it is expensive to maintain and can create sight distance problems. You suggest that the crashes on Broad Avenue are related to the numerous median openings and driveways and try to sway public opinion in your favor. You tend to get defensive when people question you because you know what's best for the corridor. You also have a habit of nodding when people are talking, which they sometimes take to mean that you agree with them.

Working with your public information specialist who will record citizen comments, you have about 15 minutes to get information from meeting attendees. Try to identify people who might support the median closures at the public meeting and what they might want in return.

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Hispanic Woman

You are a woman of Hispanic origin who lives in the neighborhood adjacent to the project. The meeting notice was in English which you do not read well and you had to get someone to translate it for you. You are upset that the DOT didn't translate the notice into Spanish because there are a lot of Hispanic people in the neighborhood who don't read English very well. Many of them have children who cross Broad Avenue every day to go to school. You are concerned about pedestrian safety and want to see something done to improve the school crossings.

The public information specialist will ask you to introduce yourself and to express any ideas or concerns you may have about the project.

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Garden Club Representative

You represent the local garden club, a politically active group that supported the successful candidate for mayor in a close election. The garden club is demanding more tree and shrub plantings along Broad Avenue. The Mayor told you that the City would help maintain the landscaping, but that DOT may not allow it because it is a safety problem. Your friend in Ft. Lauderdale told you that DOT planted trees and landscaped their median. You want DOT to landscape and add trees to the median in your neighborhood as part of the project.

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Bicycle Advocate

Relations between bicyclists and residents in the area are strained. Motorists complain about having to swerve into other lanes or wait in through lanes to avoid bicyclists. You are tired of residents trying to run you off the road with their cars and as a bicycle advocate, you feel that something needs to be done to improve your safety. You mainly want a bicycle lane and better sidewalks on Broad Avenue but might support closing some of the driveways and median openings.

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High School Principal

You are a high school principal who does not live in the area, but your school is near the project and many of your students cross Broad Avenue. You are upset because no one notified you of the meeting. You were given a meeting notice by one of your teachers who found out from her neighborhood association president. There was a problem at the high school, so you arrive at the meeting late. You are upset that the meeting was not held in the neighborhood, because the school has facilities, and the time is inconvenient. You burst into the room a few minutes after the meeting started and demand to know why you weren't notified.

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Restaurant Owner

You received a notice to attend the meeting, but it is difficult for you to go because you need to prepare for the evening dinner rush. You decide to go to the meeting anyway because you have a lot of competition in the area and have heard that the project is going to close your median opening. You feel that this will put you out of business because customers won't be able to access your business from the other side of Broad Avenue anymore. You feel that DOT has already made up its mind on the project and doesn't care what you have to say. You have political connections though and are willing to fight to the end to stop the project.

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Neighborhood Association President

You are the president of the neighborhood association where the project is being proposed. You are fed up with through traffic in your neighborhood and feel that bicyclists on Broad Avenue are making it worse (because they think they own the road, and the road is for cars, not bikes). You heard that the DOT is going to leave the median open at your neighborhood entrance, but close median openings at other public streets. You feel this will make more people cut through your neighborhood to get to Broad Avenue and want the other median openings to remain open. You also feel that DOT has already made up its mind on the project and doesn't care what you have to say.

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Shopping Center Developer

You received notice of the public meeting and are angry that the DOT is going to reconstruct Broad Avenue. You were told by the DOT that there were no plans to change median opening access on Broad Avenue and that is why you invested a lot of money in redeveloping a site with a new shopping center at one of the openings. You feel you were betrayed and are intent on stopping the project or at a minimum ensuring that the median opening in front of your shopping center stays open. You have a lot of money and high-priced lawyers ready to sue. You have brought your engineer to the meeting to dispute the need for any median opening closures. You notice that the DOT staff are nodding when people talk and feel you can get a commitment from them.

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Shopping Center Developer's Engineering Consultant

You work for a major shopping center developer, who is trying to stop or influence a project that has been proposed by DOT for Broad Avenue and which may adversely impact your client's access. This is your biggest client and you want to get DOT to commit to preserving the existing full median opening that serves your client's shopping center. You will try to dispute the need to change this median opening. You notice that the DOT staff are nodding and feel you can get a commitment.

The public information specialist may ask you to introduce yourself and to express any ideas or concerns you may have about the project.

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Public Information Specialist

You haven't had much training in public involvement but are enthusiastic about working with the public. Generally, you are doing your best to keep people happy and are trying to smile and say thank you a lot. Your job is to start the meeting and tell people that the DOT engineer will present the project, after which they will have a chance to express their ideas or concerns.

When the DOT project manager is done, you open up the meeting for comments and ask each person to introduce themselves and to share their ideas or concerns. You were told to try to keep things moving along and to keep any one person from dominating the meeting. You will restate and record on the board any concerns that people raise so you can document the comments after the public meeting. You have never done this before, and occasionally you nod your head as if in agreement or change the meaning a bit to fit what you think people are saying.

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