Assessing the Accessibility Needs of the Transportation Disadvantaged:

A Comparison of US and UK Transportation Policy

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Executive Summary

The transportation system creates barriers to some individuals and groups, known as the transportation disadvantaged, in their ability to fully participate in society. Attempts are being made in the United States and United Kingdom to address these accessibility problems. In the US, these efforts stem from environmental justice, a policy that centers on minority and low-income populations. A similar, yet distinct policy has recently gained traction in the United Kingdom called social inclusion. The transport aspect of social inclusion is known as accessibility planning. This paper will look at how the transportation disadvantaged are identified and how the transportation planning process currently assesses the accessibility impacts that are placed upon these populations in each country. Both federal guidance and regional transportation plans are examined. Special attention is paid to the use of indicators and targets in regional transportation plans which are used to measure the accessibility of the transportation disadvantaged. Finally, the accessibility assessment process in both countries is summarized along with suggestions for how this process can be improved.

1 Introduction

The transportation systems in the United States and United Kingdom have created barriers that limit the ability of certain individuals or groups to fully participate in society. Efforts are being made in the US and UK to improve accessibility for the transportation disadvantaged. The transportation disadvantaged may include, but are not limited to: low income, minority, disabled, elderly, youth, and car-less populations. The transportation system is important because it provides access to important opportunities and services such as jobs, education, health care, and grocery stores.

Chapter 2 reviews the policies that address the transportation disadvantaged in each country. In the US, the main policy is known as environmental justice. Environmental justice (EJ) specifically targets minority and low-income populations, although this concept has been extended to other populations by certain organizations. The UK has recently introduced a policy known as social inclusion. The transport aspect of social inclusion is called accessibility planning. The populations that accessibility planning focuses on are less well defined than in environmental justice, but this allows local and regional governments to determine which access problems are in most need of being addressed.
Chapter 3 looks at the way that the US and UK identifies populations that face accessibility barriers and some of the challenges researchers have identified. Chapter 4 looks at the use of accessibility indicators and targets to assess the needs of the identified populations. The federal guidance offered by both countries to regional and local agencies to identify and assess accessibility needs is reviewed in both chapters. Regional transportation plans in both countries that have included accessibility indicators are analyzed. Other important accessibility assessment tools such as public participation, community surveys, and inter-agency partnerships are also described.

Finally, a summary of the current state of identifying and assessing the accessibility needs of the transportation disadvantaged is provided along with suggestions for how this process can be improved.
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2 Environmental Justice and Social Inclusion

Before addressing the ways that transportation agencies identify and address the transportation disadvantaged, it is important to have an understanding of the overarching policies in both the United States and United Kingdom in which those efforts are couched, particularly with regard to the transportation system. The policy of environmental justice in the US stems from civil rights legislation in the 1960s and was reinforced by President Clinton in the 1990s. The UK’s policy of social inclusion has gained traction more recently and has led to a policy called accessibility planning which, while focused on transportation, also calls for better connections between transportation and other disciplines such as health care, education, and land use. This section will define these policies and provides a brief comparison between environmental justice and social inclusion.

Environmental Justice

The concept that eventually became known as environmental justice in the United States began with Title VI of the 1964 Civil Rights Act. Title VI states that, "No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." (USDOJ, 1964) Many other federal acts enhanced this policy including the National Environmental Protection Act (NEPA) of 1969 and the Uniform Relocation Assistance and Real Property Acquisition Act of 1970. In 1994, President Clinton signed Executive Order 12898 which placed an emphasis on addressing environmental justice within Federal agencies. Much of the recent attention paid to EJ issues within both transportation and other sectors stemmed from this Order.

The US Department of Transportation (USDOT) and Federal Highway Administration (FHWA) adopted their own policies and guidance based on Executive Order 12898. FHWA identifies three fundamental environmental justice principles (FHWA, 2000):

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
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- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

Given this definition, it is clear that environmental justice is concerned more with the prevention of discrimination with regards to the transportation system rather than providing equal access to key services such as jobs, education, and health care. In many ways, it is a policy put in place to correct wrongful policies of the past and ensure that all citizens be given an equitable playing field.

Environmental justice considerations fall mainly on five primary groups: Federal agencies, State DOTs, Metropolitan Planning Organizations (MPOs), transit agencies, and the public (FHWA, 2000). Federal agencies provide guidance and support to state, regional, and local agencies in the implementation of EJ policies. State DOTs often plan and construct transportation projects and must adhere to NEPA guidelines. MPOs are regional transportation bodies and must identify and evaluate EJ concerns within the metropolitan area. EJ issues must also be addressed in the creation of both short and long range plans. Transit agencies that receive federal funding play an integral role because they provide an important mobility and accessibility option for EJ populations. Finally, the public, including community groups, non-profit organizations, and academic institutions, must be heavily involved in the transportation planning process to ensure that the transportation system serves the needs of all citizens.

Social Inclusion

In the United Kingdom, the policy that addresses the transportation disadvantaged is called social inclusion. Like environmental justice, this policy spans many federal agencies and initiatives. Social inclusion is a much newer policy and is less well-defined than environmental justice. The policy aims to reduce the amount of social exclusion that some citizens experience. The U.K. federal government describes social exclusion in the following way:

The term social exclusion refers to more than poverty or low income, but it is closely related to them. It is used to describe a number of linked problems such as
unemployment, poor educational achievement, low incomes, poor housing, physical barriers and bad health which tend to have a cumulative and reinforcing effect on each other, preventing people from fully participating in society. (Social Exclusion Unit, 2002)

The initiative to create a policy regarding the role that various sectors play in social exclusion came from Prime Minister Blair in 2001. Working with researchers, government agencies, and local authorities, the Social Exclusion Unit (SEU) created a report to address the role transport plays in social exclusion called *Making the Connections: Final Report on Transport and Social Exclusion* (2003). The report focuses on the role that the transport system has on “access to those opportunities that have the most impact on life-chances, such as work, learning, and healthcare.” (SEU, 2003) The report stresses that interactions between different agencies must take place in order to address these accessibility issues.

Social inclusion is the ultimate goal and the implication in the use of that term is that society can achieve goals that change exclusion into inclusion (Hodgson & Turner, 2003, p. 265). Social inclusion can also help to achieve better overall economic productivity and this point can be used to gain larger support for changes that would enable better social inclusion (Litman, 2003). It should also be noted that a lack of access is both the result of social exclusion and that the transportation system can actually reinforce social exclusion (SEU, 2003).

**Accessibility Planning**

The policy that the U.K. has developed to address the role that transport plays in the social exclusion of a segment of its population is known as accessibility planning. This policy is designed to help local transport authorities assess and improve access to “jobs, health care, learning and food shops” (DfT(b), 2006). Priorities are to be set at the local level and local authorities should work closely with other local agencies and the Department for Transport (DfT). The federal government plans to increase funding for local transport from £0.4 billion in 1998 to £2.2 billion in 2007/08 (DfT(c), 2006).
The U.K. federal government provides the following basic definition of accessibility: “(C)an people get to key services at reasonable cost, in reasonable time and with reasonable ease?” (SEU, 2003) There is a set of factors that accessibility depends on. These are: accessibility options, information and safety, physical and financial disability, and distance to services.

Like the broader goal of social inclusion, the connection between the transport system, the land use system and key service providers is stressed.

One of the important implementation techniques is the inclusion of accessibility planning in 5 year Local Transport Plans (LTPs). The second versions of these plans came out in 2006. Much of the guidance for incorporating accessibility planning into the LTPs is provided by the Department for Transport in the form of workshops, general and technical guidelines and a website devoted exclusively to accessibility planning (http://www.accessibilityplanning.gov.uk). Local agencies are encouraged to think about accessibility planning in the context of the larger goals and visions of that area, including the development of housing and jobs.

There is a five-stage process recommended for each local transport agency (DfT (b), 2006):

- Strategic (LTP wide) accessibility assessment
- Local accessibility assessments, focusing on specific groups
- Option appraisal (identification of resources)
- Accessibility action plan development of agreed-upon initiatives
- Monitoring and evaluation

The DfT provides guidance on all of these steps. To assess accessibility, they offer a framework for mapping and auditing both the transport system and the main destination types and also provide planning software to assist local authorities. Strategic and local accessibility assessments will be discussed further in Chapter 3. Option appraisal essentially requires that the local agency assess their own resources, sources of funding, and identify options that will produce the most benefit. DfT provides a laundry list of potential initiatives that could be incorporated into action plans. Finally, local authorities must come up with local accessibility indicators. One of the requirements for the LTPs generated in
2006 is that it must include at least one local accessibility target (DfT, 2006). These accessibility indicators and targets will be discussed in Chapter 4.

**Comparison of Environmental Justice and Social Inclusion**

Many aspects of the UK’s social inclusion policy stem directly from environmental justice efforts in the US, so it is unsurprising that many similarities exist between the two policies. First and foremost, both policies recognize that the transportation system does not serve every user equally. While this may not be a completely novel concept, it is nonetheless notable that such attention is now being paid to transportation. Traditionally, much of the focus has been placed on job or education programs for the disadvantaged while the means of accessing these types of opportunities has gone under the radar. Appropriately, both policies concentrate on specific groups, but this is not limited solely to the low-income. Both EJ and social inclusion are also quite inter-disciplinary and a broad understanding of all the issues that affect the transportation disadvantaged is necessary by practitioners. However, inter-agency connections are more acutely stressed in social inclusion policy guidance.

The biggest difference between EJ and social inclusion is the emphasis on access. Transit agencies in the US that receive federal funding are mandated to produce documentation stating that their transit service is being provided in an equitable manner. To do so, they only need to analyze the minority and low-income populations within their service area and their access to the transit system itself. The transit agency does not need to show whether or not the transit service affords these populations equal access to services or opportunities. In the UK, the emphasis is on the accessibility standards that need to be met by local transport authorities. Social inclusion recognizes that if the transport system cannot get people to the destinations they need to reach in a safe, efficient manner, then the transport system has failed a portion of the population.

Environmental justice is focused mainly on low-income and minority populations while social inclusion attempts to address any group that has accessibility issues. Sanchez and Wolf (2005) argue that this broader view extends to the efforts social inclusion undertakes to aid the transportation disadvantaged. The US has limited its efforts mainly to employment
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and housing mismatches. Social inclusion is also much more concerned with equity of outcome, meaning that it looks at how the transport system can influence social indicators such as wage levels or school attendance. However, it can be very difficult to measure the transportation system’s effect on social and economic outcomes.

Another key difference between environmental justice and social inclusion is that social inclusion does not have the legal teeth that environmental justice has in the US. Users of the transportation system in the US can and have filed complaints using Title VI of the Civil Rights Act as a basis and the threat of legal action can provide tremendous leverage for the transportation disadvantaged. Social inclusion is currently a policy of the government, but it is much less legally binding and is thus more subject to the political whims of the current administration.

Polak (2002) points out two other differences between environmental justice and social inclusion. The first is that social inclusion focuses more on the direct impacts that the transport system has on the ability for citizens to access economic and social opportunities while environmental justice has tended to focus more on the indirect consequences of the transportation system such as environmental, safety, and social externalities. He also points out that environmental justice uses a reference population against which the target population is compared whereas social inclusion uses targets to see if accessibility has improved over time. Chapter 3 will illustrate the differences in which the US and UK identify the transportation disadvantaged.
3 Identifying the Transportation Disadvantaged

In order to assess the needs of the transportation disadvantaged, regional and local governments must first identify who these populations are and where they are concentrated geographically. There are two aspects of the policies of the United States and the United Kingdom that may create differences in the way each country identifies the transportation disadvantaged. The first is that under environmental justice guidelines, only minority and low-income populations need to be identified in the US, although regional and local agencies may choose to identify other populations as well. In the UK, the populations that need to be identified are less defined, so transportation agencies must cast a much wider net than their counterparts in the US. The other difference is that in order to assess the disproportionate effects that are at the heart of environmental justice policy, a reference population must also be selected and a threshold of what constitutes a disproportionate effect must be chosen. By contrast, social inclusion policy does not necessitate a reference population, although this makes the determination of thresholds over which populations are deemed socially excluded by the transportation system that much more problematic.

Some of the challenges that researchers have revealed in how transportation agencies identify the transportation disadvantaged are reviewed along with the guidance that the federal governments in the US and UK provide to state, regional, and local agencies. Regional plans in the US and UK are then analyzed to see how much they utilize and add to this federal guidance and how different they are from one region, and one country, to another. The regional plans in the US that are used in the analysis of both how the transportation disadvantaged are identified and assessed were chosen because they either have faced serious civil rights complaints or have developed accessibility indicators within their EJ planning process. They should not be viewed as representative of all regional plans in the US and some are indeed quite exceptional in their attention to EJ issues. The regional transportation plans analyzed were from the following US agencies:

- Atlanta Regional Commission (ARC)
- Boston Region MPO
- Mid-Ohio Regional Planning Commission (MORPC)
- Southern California Association of Governments (SCAG)
The 2nd Local Transport Plans of the six Passenger Transport Executives (PTEs) in the UK were all selected because they are required to incorporate and develop accessibility indicators and targets. The six PTEs are:

- Greater Manchester
- Merseyside
- South Yorkshire
- Tyne and Wear
- West Midlands
- West Yorkshire

**Challenges Identified in the Literature**

The federal guidance in the US on how to determine if road projects fall disproportionately on environmental justice populations are fairly vague leading to much variation in the way EJ identification is applied at the local level. Hartell (2006) provides an overview of the methodological problems with the identification of EJ populations and how various researchers have addressed these issues. She defines the three main issues in conducting an EJ assessment as defining the study area, defining the reference area, and determining the decision threshold. How these three things are defined can have a large effect on how EJ assessments are performed from one region to the next.

Defining the study area can be difficult because some of the social and community effects of a transportation project may be far-reaching. Even if this issue is resolved, a determination must be made about the unit of analysis. Forkenbrock and Schweitzer (1999) feel that the Census block is often the proper unit of analysis, but this can be problematic because income is only available at the Census tract level and travel demand models often use traffic analysis zones (TAZs). The use of Census data presents two problems unto itself. The first is deciding whether to use any Census block contained in the study area buffer, only the Census blocks whose centroids are located within the buffer, or extrapolate the population within a Census block based on the percentage of the area of the Census block that falls within the study area. The other problem is that Census data can be outdated and may undercount certain populations, particularly more transient groups. For this reason, some researchers suggest detailed community outreach and assessments, though these can be quite
expensive and difficult to coordinate. Problems that are unique to the specific region can also arise. Researchers in Hawaii had to devise a formula to separate each minority population for analysis in Oahu because many people identify themselves as “Two or More Races” on the 2000 Census (Li et. al, 2005).

There is also no clear guidance for choosing a reference population. Researchers agree that the size of the transportation project plays a large role in this determination. For an airport project, a larger reference area might be preferable whereas a transit project might only include the populations within the transit service boundaries. Forkenbrock and Schweitzer used the Metropolitan Statistical Area (MSA) in their EJ analysis of a road project. However, the boundaries of many MSAs in the United States change fairly often which can lead to different analyses from one Census year to the next. For this reason, the North Carolina Department of Transportation (NCDOT) uses the county as the reference area instead of the city or MSA. While the MPO or regional agency boundary often serves as the reference population for regional transportation plans such as the ones analyzed in this paper, even this may not be the proper reference area if there is more than one MPO within an MSA.

Perhaps the most difficult issue with the identification of EJ areas is deciding the threshold at which the negative externalities of a transportation project would disproportionately affect these populations. The simplest way to measure this is to look at whether the percentage of protected groups in the study area is greater than the percentage of protected groups in the reference area. However, some researchers feel that to make this disproportionality meaningful, other techniques should be used such as only including percentages of the study area that are greater than one standard deviation away from the mean of the reference area in an EJ analysis (Hartell, 2006). A simpler standard percentage above the mean of the reference area could also be used, although this method is fairly arbitrary. A final challenge in EJ assessment is that the proportion of protected groups is stressed over absolute numbers. This may lead to a situation in which Census blocks with a high number of protected populations are given less weight in the EJ assessment than those in which a high proportion of minority or low-income people reside regardless of the actual number of people who live there.
There is less research in the UK focused specifically on the identification of socially excluded populations because this is just one part of a larger process known as an *accessibility assessment*. Because the transportation disadvantaged in each region of the UK may have different accessibility issues, local agencies must play a larger role in the identification of these groups. While environmental justice assessments pose many challenges, one advantage that transportation agencies in the US have is that they are mandated to assess specific populations. Lucas (2004) asserts that assessments by transport agencies in the UK, while prescribed to a certain extent, can nonetheless be “as complex or simple a process as the assessor chooses to make it.” She suggests three key elements that all accessibility audits must incorporate: the circumstances of the people under consideration (including demographics, cultural factors, and finances), the type of activity they wish to undertake, and transport availability. She too emphasizes the use of local knowledge.

A study performed in western New York (Casas, Horner and Weber, 2006) looks at specific measures that could be used to identify socially excluded populations. The first measure they use is the Index of Multiple Deprivation (IMD) created by The Department of the Environment, Transport and the Regions (DETR). The index includes indicators of seven different domains that may indicate deprivation. The second is cumulative accessibility measures (also known as isochronic opportunity measures) which calculate accessibility based on the number of opportunities within certain travel times of a reference point. The third is space-time accessibility measures which describe how activities are arranged in space given time constraints. The authors concluded that the IMD provides a good overview of basic social exclusion, but is limited because it does not directly take travel patterns into account. The two accessibility measures were more closely correlated. The cumulative measures reflect land use patterns better than the space-time prisms, but space-time measures capture individual travel patterns better. The use of these measures depends heavily on data availability.

**Federal Guidance in the US and UK**

Both the US and UK provide guidance at the federal level to help regional and local transport agencies properly identify environmental justice populations and socially excluded groups, respectively.
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United States

The three main government agencies that offer specific guidance on how transportation agencies in the US can identify EJ populations are the Council on Environmental Quality (CEQ), Environmental Protection Agency (EPA), and Federal Highway Administration (FHWA). While the three agencies offer similar guidance on many points, some differences do exist and each agency offers a different level of detail within their documents.

Most of the federal guidance that exists in the US stems directly from Executive Order (EO) 12898 signed by President Clinton in 1994 and how this order affects the National Environmental Protection Act (NEPA) process. EO 12898 requires the development of agency-specific EJ strategies, recognizes the importance of data collection, research, and analysis, and stresses the use of public participation and access to information. A memorandum accompanying EO 12898 states that, “Each Federal agency should analyze the environmental effects, including human health, economic, and social effects of Federal actions, including effects on minority populations, low-income populations, and Indian tribes, when such analysis is required by NEPA.” (CEQ, 1997) Environmental justice falls under the community impact assessment portion of the NEPA process.

The Council on Environmental Quality produced an EJ guidance document in 1997. Appendix A of this guidance provides many of the details that help transportation agencies in the US identify EJ populations. CEQ recommends the use of Census data in any EJ analysis, including the poverty definitions for the identification of low-income populations. The document defines minorities as members of one of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is defined when over 50 percent of the study area is minority or the proportion of minorities is significantly greater than the proportion of minorities in the reference area. The guidance offers little help in terms of how agencies should define both the study and reference areas. Environmental effects are considered disproportionately high and adverse if the effects on EJ populations are significant and appreciably exceed those of the reference population. Determining which effects are “significant” is thus left up to individual transportation agencies.
FHWA produced a similar document specifically aimed at FHWA policies and programs, although many other transportation agencies use these guidelines as well. Most of the specific guidance regarding the identification of EJ populations is the same as that defined by CEQ with the exception of low-income populations. FHWA recommends using the Department of Health and Human Services (DHHS) poverty guidelines to determine whether or not a household is low-income (FHWA, 1998). FHWA provides a document that Metropolitan Planning Organizations (MPOs) can use to help their self-certification process for Title VI compliance. FHWA also provides an Effective Practices CD-ROM and holds training courses for transportation professionals.

The Environmental Protection Agency’s guidance is the most comprehensive of the three. While it generally uses the same definitions of EJ populations that CEQ offers, the EPA guidelines offer more advice on the options transportation agencies have when conducting an EJ assessment. For instance, while the EPA also recommends the use of Census poverty definitions to identify low-income populations, the guidance states that analysts “should also consider state and regional low-income and poverty definitions as appropriate.” (EPA, 1998). The document also urges transportation agencies to use local resources to identify EJ populations. EPA provides a list of factors that should be considered in addition to race, ethnicity, and low-income status. These include age, literacy, population density, health care access, and cultural expectations.

**United Kingdom**

The UK federal government offers guidance to regional transport agencies for the accessibility assessments they must conduct in the development of Local Transport Plans (LTPs). Whereas US guidance seeks to identify specific populations that may be adversely affected by a number of different factors (including environmental degradation and human health and risk factors), UK guidance works the opposite way. It seeks to identify a specific factor first, namely accessibility concerns, and then determine which groups are most affected by that factor. The UK guidance provides a more step-by-step approach to identifying the transportation disadvantaged, but like the US, much is left to local discretion. The main guidance document for conducting these accessibility assessments is the Department for Transport’s *Accessibility Planning Guidance* (DfT(a), 2006).
Before offering specific guidance about how transport agencies should conduct accessibility assessments, Department for Transport (DfT) stresses two main points. The first is that, true to the larger social inclusion policy, assessments should concentrate on wider objectives such as improving accessibility to jobs, education, health care, grocery stores, or items of local importance. Secondly, many different types of evidence should be used. These include mapping audits, local knowledge, and surveys. The rest of the guidance document breaks the assessment approach into two stages: a strategic area-wide accessibility assessment and more detailed local assessment focused on specific areas, groups or issues.

The first step in the strategic assessment is a mapping audit. Using readily available data, a mapping audit aims to give a broad picture of accessibility problems and issues that exist in the region. Audits can use any combination of Census data or other local information, core accessibility indicators, and the Index of Multiple Deprivation to identify socially excluded groups or areas. The use of accessibility indicators is examined further in Chapter 4. The federal government provides copies of an accessibility software called Accession for use in the development of LTPs.

The next step in the assessment is to discuss the results of this initial mapping audit with other departments and agencies. This can show important partners where accessibility problems exist and help these partners better define their role in improving accessibility. The last step in the strategic assessment is the prioritization of areas, groups, and issues that need to be studied further in local assessments. The guidance suggests first targeting areas or groups where disadvantage is greatest or where accessibility improvements are most likely to address an area’s wider objectives.

The second stage is the local accessibility assessment. Like the strategic assessment, this stage is broken down into three steps. The first is to examine the local evidence. This can include local sources of data and qualitative evidence that comes from local knowledge and surveys. The guidance provides a table listing potential sources of local evidence including the strengths and weaknesses of each. The second step is to produce more detailed mapping audits tailored to local needs and priorities. Pilot studies found the following maps useful: major generators of travel, school transport eligibility, catchments of local health centers by
public transport or walking, public transport routes and frequencies, and specific population groups.

The final step in the local accessibility assessment is to conduct new surveys and research when necessary. This can help fill in the gaps left by the mapping audits and make sure that the existing data matches actual conditions. Done in conjunction with other agencies, this research can also help build partnerships in improving accessibility and helps transport agencies meet directly with the people accessibility planning is aimed at.

**Regional Transportation Plans and 2nd Local Transport Plans**

The environmental justice assessments of large metropolitan areas in the United States are often reflected in regional transportation plans. The ways EJ populations are defined in these plans is different for each region and inform which populations are assessed using accessibility indicators. The methods used to identify socially excluded populations in different regions in the UK are made available in the 2nd Local Transport Plans that were published in 2006. Like their US counterparts, LTPs identify the transportation disadvantaged differently from region to region, though the methods for doing so are much more uniform in the UK. It should be noted that while this review focuses on the technical demographic analysis used in the identification of the transportation disadvantaged, most plans also require public participation and more qualitative analyses to help inform this process as well.

**United States**

*Atlanta Regional Commission (ARC)*

For *Mobility 2030*, The Atlanta Regional Commission’s regional transportation plan, EJ areas are defined as Census block groups that exceed the proportion of Black, Hispanic, Asian-American, or low-income people in the 13-county region that ARC encompasses. FHWA guidance is used to categorize these populations. However, areas of special attention are defined as having at least 20% of the population in the lowest income category and a minority population greater than 50%. This is different from the 2025 long range plan which defined EJ areas as either 50% minority, 20% low-income, 20% elderly, or 20% car-less (Polak, 2002). While the 2030 plan includes maps showing the percentage of car-less
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households in the region and the percentage of households that spend 35%+ of their income on housing, there are no longer thresholds for defining these groups as EJ areas and the elderly are only given a small paragraph in the plan.

Boston Region MPO

The draft version of Journey to 2030, the long range transportation plan for the Boston Region MPO, uses the TAZ as the geographical unit of analysis. The MPO boundaries serve as the reference area and EJ areas are considered to simply be TAZs where the proportion of protected groups is greater than the mean for the region. In the 2025 plan, four groups fell into EJ consideration: low-income, minority, not fluent in English (above age 5), and zero-vehicle households. The last two are noteworthy because they go above and beyond the federal definition of environmental justice. However, in the 2030 plan only low-income and minority groups are considered. The low-income group is defined as 80% of the median household income or below. This differs from the federal guidance that suggests the use of either Census or DHHS poverty thresholds. The Boston Region MPO also targets specific EJ areas, defined as TAZs that are at least 50 percent minority or where median household income is at or below 60 percent of the region’s median. Each TAZ must have at least 200 minorities to be considered.

Mid-Ohio Regional Planning Commission (MORPC)

The special populations identified in the Mid-Ohio Regional Planning Commission’s 2030 Transportation Plan include minorities, Hispanics, elderly, disabled, people in poverty, and households without cars. After a wide search, it was determined that only the 2000 Census data was detailed at a low enough geographical level for proper analysis. Data from Census block groups were then converted to the TAZ level so that information from the regional travel demand model could be used for further analysis. Unlike the Boston Region MPO, MORPC uses the DHHS poverty thresholds in its analysis of low-income populations. Any EJ population that exceeds the regional average is deemed to be an area of consideration. One innovative technique that MORPC uses to display both the proportion and the concentration of EJ populations is using graduated colors for proportion and dots to indicate density on the maps in the plan. This allows the reader to have an excellent visual representation of not only where these populations are concentrated, but how many live in
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particular areas. See Figure 3-1 for an example of one of the maps included in the 2030 plan.

Figure 3-1. MORPC Distribution of Population in Poverty by TAZ (2000)

Southern California Association of Governments (SCAG)

The Southern California Association of Governments (SCAG) is the MPO for a six-county region in the Los Angeles area, an area it uses as its reference population in EJ analysis. SCAG is unique among the US regional examples because it is “majority minority”. Federal guidance states that “minority populations should be identified where either…the minority population of the affected area exceeds 50 percent or [where] the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.” (CEQ, 1997) SCAG must use the “meaningfully greater” criterion for its 2004 Regional Transportation Plan since much of the reference area is over 50 percent minority, though the plan does not indicate how SCAG determines what is “meaningful” in every instance.
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SCAG analyzes each minority group separately so that impacts can be assessed across groups. SCAG also takes elderly and disabled populations into account for some of their EJ analysis.

Summary
As this small sample of regional transportation plans shows, the identification of EJ populations can vary widely from region to region. The groups considered in the EJ analysis were different for each region. Agencies that use the strict definition of what constitutes an EJ population provided by EO 12898 are ignoring other populations that may experience significant accessibility barriers. It is thus a bit disturbing that two of the regions analyzed reduced the number of groups they considered as EJ populations from their 2025 plans to their 2030 plans. The definition of low-income populations also varied, reflecting the inconsistencies in the federal guidance. Perhaps most importantly, the thresholds at which EJ populations are given special attention were radically different and were presented in many different ways within the plans.

While some of these differences in definition may be due to the demographic differences of the regions, the MPOs do not describe how they came to the decisions they did. The apparent arbitrary nature of these definitions and thresholds does not allow for an assessment of how strong the evidence is that each MPO uses to make its decisions about how to include the accessibility needs of EJ populations in the transportation planning process. MPOs should conduct analyses to see how sensitive each parameter is to small variations. If such assessments were made in the development of the long range transportation plans, these should be documented in the plans themselves. MPOs should, at the very least, be required to justify whatever definitions they choose, especially because they may need to be defended in Title VI complaints. This inconsistency in the identification of EJ populations also makes comparisons across regions of the US very difficult.

United Kingdom
Unlike regional transportation plans in the United States, the 2nd Local Transport Plans put forth by the six Passenger Transport Executives (PTEs) in the United Kingdom are much more uniform in their approach to identifying the transportation disadvantaged in their
respective regions. All follow the basic steps of the accessibility assessment strategy laid out by the federal government. Nonetheless, some differences in the approach that PTEs take to identify accessibility issues are present.

All of the PTEs assess access to the three key sectors identified in the Social Exclusion Unit’s *Making the Connections: Transport and Social Exclusion* report: employment, education, and health/food. However, there were different emphases on these sectors depending on regional priorities. For instance, both the South Yorkshire and West Midlands PTEs stress access to the employment sector and in particular Regeneration areas that had been determined prior to the 2nd Local Transport Plan’s creation. Regeneration areas are communities that are undergoing transformation and specific funding is available from the federal government to create jobs, improve housing and education, and reduce crime. Other PTEs focus mainly on access to health care or secondary education.

Some of the PTEs already had fairly rigorous accessibility strategies in place, although these may have been slightly different than the guidance on accessibility assessment that the federal government provides. Merseyside, for example, had an accessibility strategy known as “Breakthrough”. Many of the initiatives in the Merseyside LTP simply build upon the programs that had previously been developed. Many of the PTEs had also developed specific software to assess accessibility issues in their region. While every LTP mentioned the use of the Accession software provided by the federal government, some acknowledged that they are considering synergies between Accession and their in-house software to ensure that the strengths of each are not lost (SYPTE, 2006).

The biggest difference between the LTPs is the way that each PTE identifies priority areas. While some plans were not specific about how these priorities were set, others provided some detail as to how this was determined. Three PTEs utilized the Index of Multiple Deprivation (IMD) in some capacity. The Index combines seven distinct dimensions of deprivation into a single number which represents relative deprivation. Merseyside identified 38 areas that were deemed to have high social exclusion because they were in the top 10% most deprived areas according to the IMD. Using Accession, South Yorkshire targeted geographical areas by analyzing the nexus of high deprivation areas and
Neighbourhood/Housing Market Renewal sites that had been previously identified. Three areas, all of which were in the top 10% most deprived areas, were chosen for a study performed in Greater Manchester to identify the services that people wish to access.

The Index of Multiple Deprivation is not the only way PTEs identify the transportation disadvantaged in their areas. West Midlands used market research to define the thresholds it uses for its accessibility indicators. A willingness-to-pay survey was employed to determine how long people would be willing to travel by various modes and how much they would be willing to pay to access key services. The West Yorkshire PTE uses the DfT core accessibility indicators to measure their performance and determine areas of prioritization.

There are many similarities between the way that the transportation disadvantaged are identified at the regional level in both the US and UK. Both countries leave much of the identification process up to the regional transport agencies. This allows for much variation in the way groups and geographic areas are identified and in the thresholds that determine the prioritization of attention and resources. The major difference is that the UK process is very evidence-based, using accessibility measures to determine which populations need special attention. This contrasts sharply with the US approach of identifying specific demographic groups regardless of their actual accessibility needs. While the UK approach is preferable, it still suffers from some of the same problems as the US approach. With the exception of West Midlands, they still use arbitrary decision thresholds and do not provide a sensitivity analysis for their decisions or justification for their choices.

Chapter 4 will analyze the use of accessibility indicators and targets in both countries to assess the needs of the transportation disadvantaged.
4 Accessibility Indicators

Identifying the transportation disadvantaged is a very important step, but this is only the beginning of the assessment process. One of the methods that transportation agencies use to assess and prioritize the needs of the targeted populations they identify is the development of indicators. Indicators are variables selected and defined to measure progress towards an objective (Gudmundsson, 2001). Indicators can be utilized for a host of factors that are affected by the transportation system including environmental quality, economic development, and mobility. This chapter focuses on the way indicators can be used to assess the accessibility needs of the transportation disadvantaged and the targets that transportation agencies have developed to either maintain or improve accessibility for these populations.

UK’s Department for Transport states that accessibility indicators are “used to quantify accessibility and assess the ease with which an individual, population segment or community can access one or more services from a residential or other location using available modes of transport.” (DfT(d), 2006) Accessibility measures can be used to identify priorities, set targets, and monitor performance and outcomes.

The first part of this chapter reviews the different ways of measuring accessibility that have been developed. This is followed by a summary of the federal guidance available in the US and UK on accessibility indicators and the different indicators used in regional transportation plans in both countries. Finally, other important factors in the assessment of the accessibility needs of the transportation disadvantaged are addressed, including public participation, community surveys, and establishing inter-agency partnerships.

Different Ways to Measure Accessibility

El-Geneidy and Levinson (2006) review five different ways to measure accessibility. The first measure is the isochronic or cumulative opportunity measure which is used by most of the transportation plans analyzed in this paper. Isochronic measures count the number of potential opportunities within a specific distance or travel time. They are very simple to calculate and understand, but artificial thresholds must be set and these measures do not take the attractiveness of the destination or impedance (cost) of getting to that destination. This
means that every opportunity is deemed to be equal and practitioners must determine how the thresholds and targets for these measures should be set.

The second accessibility measure, the *gravity-based* measure, is preferred by most researchers to isochronic measures, but is more complex and is not as readily interpretable by the public or policymakers. Gravity-based models are based on the theory that certain destinations will have more attraction than others and that there is a cost to reach destinations that increases with time, distance, and generalized cost. There are a few disadvantages with gravity-based models. One is that they require more data than isochronic measures. A cost, or impedance, factor must be calculated which requires trip distribution data. Second, a decision must be made about the proper weights to attach to particular destinations. Third, while accessibility via different modes of travel can be calculated separately, it can be difficult to combine all modes into one measure. Finally, the results of gravity-based measures are not as easy to instantly interpret, so more explanation is needed to translate these measures for the public and policymakers (El-Geneidy and Levinson, 2006). Despite these limitations, gravity-based measures are considered more robust by researchers and avoid the need for the development of artificial thresholds (Lucas et. al, 2006).

The third measure El-Geneidy and Levinson mention are *utility-based* measures. Utility-based measures are similar to gravity models, but incorporate individual travel preferences, whereas gravity models imply that all people within a particular TAZ will have the same preferences and thus the same level of accessibility. These measures require a large amount of data and are more complex than gravity-based measures, but because they are based on actual travel behavior utility-based measures offer some advantages to the gravity-based measures. Despite the fact that many discrete-choice based travel forecasting models calculate utility-based measures, the utility-based measure is still mainly a topic of academic research. El-Geneidy and Levinson hypothesize that their complexity and data intensity have prevented their inclusion in practice. Utility-based measures can also be difficult to convert into meaningful units, which mean that considerable efforts would need to take place to make the results of these measures understandable to readers.
The fourth and fifth accessibility measures mentioned are constraints-based measures and a composite accessibility measure. Constraints-based measures bring constraints such as congestion and individual time availability into account (Wu and Miller, 2002). One type of constraint-based measure is the activity-based measure which incorporates scheduling constraints and characteristics such as trip chaining into the measurement of accessibility (Dong et al., 2004). The composite accessibility measure is a combination of constraints-based and utility-based measures. These measures have thus far remained in the realm of academic research and it is unclear whether or not regional transportation agencies have the requisite data and expertise to use these types of measures in a meaningful way in the transportation planning process.

**Federal Guidance in the US and UK**

*United States*

Much of the federal guidance on how environmental justice policy should be applied to the transportation sector in the US has been focused on the avoidance, when possible, or mitigation, when necessary, of the disproportionately adverse effects that federal programs and projects may have on EJ populations. There has been comparatively little attention paid to considering the accessibility needs of these populations when prioritizing transportation programs and projects. It is thus unsurprising that there is little federal guidance on how transportation agencies in the US can utilize accessibility indicators to identify these needs. It would be wrong, however, to assert that current guidance does not leave room for such guidance to be further developed. FHWA’s principal guidance on how the agency should implement EO 12898 states that federally funded activities must “ensure that social impacts to communities and people are recognized early and continually throughout the transportation decisionmaking process—from early planning through implementation.” (FHWA, 1998) While this policy does not mention accessibility specifically, an increasing number of researchers are making the link between the lack of access to key opportunities and the social exclusion of certain groups and geographic areas (see e.g. Church et al., 2000).

A memorandum circulated by FHWA and the Federal Transit Administration (FTA) in 1999 provides a list of review questions to help metropolitan and statewide planning organizations review their compliance with Title VI requirements. One of these questions is: “Does the
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planning process seek to identify the needs of low-income and minority populations?” (FHWA, 1999). This question is significant because it asserts that planning organizations should move beyond just addressing the adverse impacts of transportation projects on EJ populations. The development of appropriate accessibility indicators is one way that planning organizations can assess the needs of the transportation disadvantaged.

FHWA published Transportation & Environmental Justice: effective practices in 2002 which contains a section about the use of performance measures, including accessibility measures. This guidance encourages the use of appropriate performance measures as a way that agencies can comprehensively prioritize projects and institutionalize the consideration of the social impacts that projects have. The guide offers the following accessibility indicators:

- % of population within accessible distance to needed institutions or services (e.g., hospitals, education, retail) by race/ethnicity and income
- Average # of jobs within X minutes by mode
- % of non-work trips in X minutes by mode
- Average travel time to work by mode
- Average cost of travel

The guidance also gives examples of transit and transit frequency measures under the accessibility category and provides two case studies of the use of accessibility indicators in two MPOs not covered in this paper: Southeast Michigan Council of Governments (SEMCOG) and Metropolitan Transportation Commission (MTC) in the San Francisco area. Both case studies highlight some of the difficulties in using accessibility indicators. SEMCOG could not incorporate transit into its accessibility index because it had not been included in the latest travel demand forecasting model. MTC only considered accessibility to jobs and had not developed accessibility indicators for other important services such as child care, grocery stores, and higher education.

EPA has published a toolkit for environmental justice assessment and includes a section on environmental justice indicators. However, accessibility indicators are not one of the categories that EPA chooses and only two indicators that fall under the “Social Indicators” category could be considered accessibility indicators:
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- Percent of community with access to public transportation and services
- Percent of community with access to health care facilities (EPA, 2004)

It is impressive that EPA includes accessibility indicators in its guidance, but the agency should consider expanding its list to include a more complete set of accessibility indicators.

United Kingdom

Unlike the US, the federal government in the UK offers significant guidance and technical assistance to regional transport agencies in the development of accessibility indicators and targets. The main guidance document is called *Accessibility Planning Guidance: Full Guidance* (DfT\(^{(a)}\), 2006). This document details all of the steps that Passenger Transport Executives (PTEs) must follow to properly implement the use of accessibility indicators.

All PTEs are required to include accessibility indicators and targets in their 2\(^{nd}\) Local Transport Plans (LTPs), and demonstrate that the indicators used further accessibility objectives. The guidance lays out a number of ways that accessibility indicators and targets can be used including monitoring progress in achieving desired outcomes and assessing the progress of specific projects. Three indicator sets should be used by PTEs: core accessibility indicators which were developed by the Department for Transport, locally derived performance indicators aimed at specific areas or groups, and project level indicators.

Project level indicators do not necessarily need to be included in the 2\(^{nd}\) LTPs.

The core accessibility indicators all measure total travel time via public transport (including walking and bicycling) and are measured centrally by DfT. The indicators are:

- % of a) pupils of compulsory school age; b) pupils of compulsory school age in receipt of free school meals within 15 and 30 minutes of a primary school and 20 and 40 minutes of a secondary school by public transport;
- % of 16-19 year olds within 30 and 60 minutes of a further education establishment by public transport;
- % of a) people of working age (16-74); b) people in receipt of Jobseekers' Allowance within 20 and 40 minutes of work by public transport;
- % of a) households b) households without access to a car within 30 and 60 minutes of a hospital by public transport;
% of a) households b) households without access to a car within 15 and 30 minutes of a GP by public transport; and
% of a) households b) households without access to a car within 15 and 30 minutes of a major center by public transport.

Most of these core indicators include a group that may face social exclusion and a reference population. They were chosen because the Social Exclusion Unit deemed these trip purposes to be the most important for life chances. Access to food shopping was not included due to a lack of data, though access to a major center can be used as a proxy. The thresholds for these core indicators were based on a National Travel Survey with the lower threshold being the median travel time and the higher threshold being twice that number. DfT provides absolute numbers as well as proportions for each indicator. DfT also provides a composite or overall accessibility indicator based on the core indicators, which is somewhat similar to what the Index of Multiple Deprivation provides except that this composite is focused solely on accessibility. The composite indicator is calculated by summing the continuous (gravity-based) core measures and applying an appropriate weighting factor, as appropriate.

Local authorities are encouraged by the guidance to develop their own accessibility indicators based on local situations and priorities. These may be aimed at specific transportation disadvantaged groups, specific areas, and other destination types not covered in the core indicators. The thresholds can be different in local indicators as compared with the core indicators as long as local authorities can justify these choices. The guidance document provides a long list of accessibility indicator examples based on pilot studies that could be used at the local level.

Each PTE is expected to set at least one target for improved accessibility based on one of the core indicators, one of the locally-derived indicators, or both. Authorities should provide evidence for how they determined what targets are appropriate and targets should have a quantifiable outcome indicating a direction and degree of change over a specific time period. Accessibility indicators and targets may be used in option appraisal and funding priorities, but only outcome-focused indicators and targets relevant to the public need to be included in the LTPs.
In addition to the main guidance document, DfT also provides substantial technical guidance for the implementation of accessibility indicators and targets. This guidance includes a chapter about the different types of accessibility indicators that could be used: access, threshold, and continuous measures. Access measures simply assess the ease of access from home to a mode of travel, such as a bus stop. Threshold measures combine travel characteristics such as cost, time, and distance, socio-demographic information, and characteristics of the facilities or services people wish to reach. Threshold measures are most commonly used because of their simplicity. Continuous measures (or gravity-based measures) are similar to threshold measures, but add a deterrence factor for things such as distance or barriers. All three types of measures can be shown in absolute or relative form and can be combined into composite or comparative measures.

The technical guidance details how the core indicators were determined. It also offers significant technical assistance in the development of appropriate local accessibility indicators and targets and how these can be used in mapping audits. Finally, the guidance provides details about the data used in the formation of core indicators and what data is available to local authorities. Both the main guidance document and the technical guidance are quite comprehensive and while there is still much room for local interpretation of how to best use accessibility indicators in their region, the methods for this determination are prescribed at the federal level to maintain some consistency through the accessibility planning process.

Regional Transportation Plans and 2nd Local Transport Plans
While there has been very little federal guidance on accessibility indicators in the US, some regional transportation agencies have begun developing some indicators in order to better assess the needs of EJ populations in their long range transportation plans. In the UK, the federal government has taken the lead on the use of accessibility indicators by providing core indicators that can be analyzed in the 2nd Local Transport Plans along with encouraging the development of locally-suitable indicators and a mandatory target.
United States

Atlanta Regional Commission (ARC)

Mobility 2030, ARC’s regional transportation plan, has seemingly taken a step back from the 2025 plan in terms of assessing the accessibility needs of EJ populations. As shown in Chapter 3, the definition of an EJ area for ARC no longer includes the elderly or car-less. In similar fashion, the accessibility indicators that existed in the 2025 plan are no longer present in Mobility 2030. The 2025 plan analyzed the share of jobs that are accessible from a transit stop and that are accessible within 40, 50, 60, and 75 minute isochrones by transit for each income group. It also included a comparison of travel times to five activity centers for two low-income Census tracts. Additionally, in the 2025 plan ARC adopted a target of ensuring that 30 percent of people in low-income areas can reach an employment center within 60 minutes by transit (Polak, 2002). The only target for increased accessibility in the 2030 plan is a “22% increase in availability of transit facilities within 0.4 miles for traditionally underserved populations.” (ARC, 2004) A map in the 2030 plan shows the spatial relationship between EJ populations and “key services” which are defined to be workforce centers and hospitals, however no assessment accompanies the map. It is unclear why the accessibility indicators and targets used in the 2025 plan were either abandoned or not mentioned in the 2030 plan.

Boston Region MPO

The following accessibility indicators, given in both travel time to the destination and absolute number of destinations, are examined in the draft version of Journey to 2030, the long range transportation plan by the Boston Region MPO:

- The average travel time to industrial, retail, and service jobs within a 40-minute transit trip and a 20-minute auto trip
- The average number of industrial, retail, and service jobs within a 40-minute transit trip and a 20-minute auto trip
- The average travel time to hospitals, weighted by the number of beds, within a 40-minute transit trip and a 20-minute auto trip
- The average number of hospitals, weighted by the number of beds, within a 40-minute transit trip and a 20-minute auto trip
- The average travel time to facilities of two- and four-year institutions of higher education, weighted by enrollment, within a 40-minute transit trip and a 20-minute auto trip
• The average number of two- and four-year higher educational facilities, weighted by enrollment, within a 40-minute transit trip and a 20-minute auto trip

The Boston Region MPO is the only MPO analyzed in this paper that uses weights for some of their trip attractions, though it is not clear why jobs were not weighted. Using weights allows for a more realistic representation of which trip attractions people will favor. Differences are analyzed between the 2000 base year network, 2030 no-build network, and 2030 build-out network. They are also analyzed for both EJ and non-EJ areas. From these indicators, the plan concludes that travel times to area destinations will stay the same or decrease and access to services will increase for EJ populations in the 2030 build-out network as compared to the 2030 no-build network. The MPO found that travel time will decrease and access to opportunities will increase for EJ populations in the 2030 build-out network as compared to the 2030 no-build network and that these improvements in travel time and access will be more pronounced for transit.

This analysis is only displayed for the region as a whole, however, so the differences for particular sub-groups or sub-regions are not made available in the plan. It is not explained in the plan how the average travel time was calculated nor is it explained how the thresholds used for each indicator were determined. The choice of destinations for the accessibility indicators is never discussed in the plan. Finally, it is unclear if and how the socio-economic demographics of the region or number and location of destinations were projected to 2030.

_Mid-Ohio Regional Planning Commission (MORPC)_

Like the Boston Region MPO, MORPC analyzes its accessibility indicators in their 2030 Transportation Plan under three scenarios: 2000 base year network, 2030 no-build network, and 2030 build-out network. The total regional percentage by population group by TAZ was assumed to stay the same in 2030 as they were in 2000. However, because the population is projected to grow more in areas with few target populations, the overall percentage of target populations for the region is projected to decrease. MORPC makes a distinction between accessibility measures and travel measures. Travel measures consider the estimated trip making patterns while accessibility measures assumes that everyone is making the same trip.
MORPC uses the following accessibility and travel measures in its 2030 Transportation Plan:

**Accessibility Measures**
- Average number of accessible job opportunities
- Average number of accessible home-based shopping opportunities
- Average number of accessible non-shopping attractions, such as medical appointments or banking
- Percent of population close to a college
- Percent of population close to a hospital
- Percent of population close to a major retail destination
- Transit accessibility to Columbus CBD

**Travel Time Measures**
- Average travel time for work trips
- Average travel time for home-based shopping trips
- Average travel time for non-shopping home-based trips
- Average travel time for all home-based trips
- Average travel time to Columbus CBD

Isochronic opportunity measures were used for the indicators with the exception of home-based shopping opportunities and non-shopping attractions which use gravity-based measures. Attractions are estimated in the trip generation process and are a measure of how many trips these destinations attract on a typical day. MORPC then calculates a weighted average for these two types of destinations based on the number of each population group within each TAZ. **Figure 4-1** gives an example of how the 2030 plan displays the results of these indicators for each EJ population defined in the plan. Because travel times were less and access to opportunities greater for EJ populations, MORPC concludes that there are no adverse impacts on the target populations and no disproportionate impacts on any particular population for any of the accessibility or travel measures. Like the Boston Region MPO, this analysis is only given at a region-wide level. The specific travel times for what MORPC considers “accessible” and “close” for each indicator are described in the plan, but how these travel time thresholds were determined is not described.
Southern California Association of Governments (SCAG)

SCAG provides a good amount of detail about the methodology they use to calculate accessibility indicators. These indicators are analyzed at the 2030 base scenario and 2030 plan improvements scenario. The percentage of ethnic and minority populations in the region is expected to change by 2030, but the low-income group is held constant. The most notable aspect of the methodology is that SCAG uses county-level Public Use Microdata Samples (PUMS) from the 2000 US Census to determine the ratio of trip-making rates by income and by mode. This ratio is then applied to each TAZ in the county under the assumption that every person with the same income level will have similar trip-making behavior. This assumption might not capture the differences in trip-making behavior that may exist for EJ populations in radically different parts of a county.

Unlike the Boston Region MPO and MORPC plans, SCAG chooses to only use accessibility indicators for jobs in its 2004 Regional Transportation Plan. They calculate accessibility to jobs by both mode and income group and mode and ethnic/racial groups. These results are based on the percentage of total jobs accessible within 45 minutes and percentage of retail/service jobs accessible within 45 minutes. No reason is given for the 45 minute threshold or why only access to jobs was analyzed, although the plan does mention that the location of service jobs can be used as a proxy for other essential services. Figure 4-2 shows an example of how SCAG displays the results of one of these indicators. A comparison of accessibility improvements from the base scenario to the 2030 plan scenario is also provided by travel mode for income quintiles, travel mode for ethnic/racial groups, and travel mode alone. SCAG concludes that their analysis shows that, “when the travel
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mode and time are held constant for all groups, generally there are no major differences in accessibility by race or by income.” (SCAG, 2004) However, SCAG does recognize that there are still large disparities between modes and that low-cost transit amounts to only 2% of the opportunities to access jobs with 45 minutes. This will have the greatest effect on individuals who depend solely on transit, though the plan does not discuss this fact in great depth or offer specific ways they are addressing this issue.

Figure 4-2. SCAG Accessibility to Jobs by Mode and Income Group Indicator Results

While only a small sample of MPOs, this review highlights some of the problems agencies can encounter when using accessibility indicators. MORPC and SCAG concluded that there are virtually no adverse accessibility or travel time effects for EJ populations as compared to the reference population. These conclusions do not necessarily mean, however, that the accessibility of EJ populations in absolute terms is at acceptable levels in these regions. As an example, Figure 4-2 above shows that while households in the lowest income quintile have more jobs available within 45 minutes of their homes than other quintiles, their opportunities are significantly lower if they are forced to travel by transit than if they travel by auto. In addition, these plans only report accessibility on a regional level. A more localized approach such as the use of community surveys and public participation should be used to determine if specific areas of the region are experiencing accessibility problems. The use of public participation and community surveys is explored later in this chapter.

Summary
While only a small sample of MPOs, this review highlights some of the problems agencies can encounter when using accessibility indicators. MORPC and SCAG concluded that there are virtually no adverse accessibility or travel time effects for EJ populations as compared to the reference population. These conclusions do not necessarily mean, however, that the accessibility of EJ populations in absolute terms is at acceptable levels in these regions. As an example, Figure 4-2 above shows that while households in the lowest income quintile have more jobs available within 45 minutes of their homes than other quintiles, their opportunities are significantly lower if they are forced to travel by transit than if they travel by auto. In addition, these plans only report accessibility on a regional level. A more localized approach such as the use of community surveys and public participation should be used to determine if specific areas of the region are experiencing accessibility problems. The use of public participation and community surveys is explored later in this chapter.
The fact that both Boston Region MPO and MORPC used gravity-based measures is a step in the right direction and other MPOs should follow suit if the data needed is available. However, the fact that at least two of the plans narrowed either the groups considered in the accessibility indicators or the indicators themselves with no reason given is troubling. In addition, the temporal aspect of accessibility for EJ populations needs to be explored further, particularly access to activities such as 2nd or 3rd shift jobs where public transit may not be available or convenient. The feasibility of using measures that include a time-constraint element should be explored.

It is noteworthy that none of the MPOs set targets for their accessibility indicators. Instead, only the proposed long-term changes to the transportation system are analyzed. Using these proposed changes is appropriate to calculate what effect they will have on accessibility for EJ populations, but the plans do not state how these accessibility indicators inform the long range plan itself. Until a feedback loop is made explicit, it is unclear how the results of the accessibility indicators will actually be used to improve accessibility. Targets, as long as they are not arbitrary, can help this process by making accessibility goals explicit in the long range plans.

Finally, like the identification of EJ populations, the accessibility indicators and the thresholds used in these long range transportation plans seem to be fairly arbitrary. Without knowing how these were chosen or how sensitive they are to variation, it is impossible to know how robust the conclusions are that these MPOs are making in their long range plans.

**United Kingdom**

**Greater Manchester**

The Greater Manchester Passenger Transport Executive (GMPTE) chose two accessibility indicators for which targets were set in their 2nd Local Transport Plan (LTP). These are:

- Percentage of Greater Manchester population within 30 minutes public transport access to a local center with an interchange of category A by 0845
- Percentage of Greater Manchester population in receipt of Job Seekers Allowance within 30 minutes public transport access to a local center with an interchange of category A by 0800
A category ‘A’ interchange is a major rail or bus station. Job Seekers Allowance is a program for people who are actively seeking work, but whose income and savings level qualifies them for assistance. No reason is given for the difference in the morning time thresholds and it is interesting to note that these two indicators are not being compared despite the fact that one looks at the general population, while the other identifies a specific disadvantaged group. Accessibility indicators for important sectors such as education and health care were considered, but were not feasible because of a restructuring of local agencies. In addition, local centers were used instead of job centers partially because local centers could be used as a proxy for other sectors including access to food and because they are often the interchange point for further travel. GMPT also believe that “Raw access to employment ignores both the potential mismatch between jobs and the skills of job seekers, and the reasonableness of travelling significant distances to take lower paid jobs or part-time jobs.” (GMPTE, 2006)

The current value for the first indicator is 84.9% and the value for the second is 88.8%. Due to a lack of historic data, GMPTE used trends in countywide access to the bus network to determine their targets for the two indicators. Access to the bus network held fairly constant over the previous 5 years despite a downward trend in the geographical coverage of the bus system. For this reason, it was deemed appropriate and realistic to maintain the current levels of accessibility. Targets were set as 85% for the first indicator and 90% for the second for each year of the LTP. GMPTE also reports the results of the core indicators provided by DfT and two additional indicators: bus satisfaction and bus punctuality, although neither of these is strictly an accessibility indicator and no targets are set.

Merseyside

Merseyside has developed two local accessibility indicators and targets for use in its 2nd LTP. These targets are:

- An average 1% per annum improvement to the number of workless Merseyside residents within 30 minutes of a major employment center by public transport.
- An average 1% per annum improvement to the number of 16-18 year olds not in education, employment or training within 30 minutes travel time by public transport, walking, or cycling of a post 16 learning institution.
The first indicator was established with an agency called Jobcenter Plus (JCP) to address the issue of low travel horizons for job seekers. The 30 minute threshold was set because many JCP clients find a journey longer than 30 minutes to be a major barrier to accessing new employment opportunities. The second indicator was established in partnership with the Learning and Skills Council to address the low skills base that may lead to difficulties in finding employment. The 30 minutes threshold for this indicator is not explained in the LTP. The LTP also does not give the base year results of these indicators, or why a 1% increase per year was chosen other than to show improvement in access. It is thus difficult to know how reasonable these targets are. In addition, a 1% increase in the final year of the LTP is more difficult to achieve than a 1% increase in the first year meaning that Merseyside would need to gradually increase its efforts year by year to meet the targets. This point is not addressed in the plan.

Merseyside mentions the core indicators set by DfT, but does not indicate how these inform their accessibility strategy. The LTP also mentions some secondary accessibility indicators that Merseyside will monitor including rural access to bus stops, physical accessibility to public transport and rail stations, safety and security, and affordability of public transport. Targets as of the final year of the LTP are set for the percentages of buses that have low floor vehicles and percentage of bus stops that have raised curbs.

**South Yorkshire**

The focus in South Yorkshire is on access to work, particularly with regards to regeneration areas in the region. The two indicators related to this priority are access to work and access to local centers. SYPTE used its own in-house software to calculate an annualized index for access to work, known as Employment Access Score (EAS), and access to local centers, known as Local Center Access Score (LCAS), for each household within Housing Market Renewal/Neighbourhood Renewal/Priority areas. This index is based on data regarding origins, the road network, the public transport network, and destinations. EAS represents the employment choice available to households by combining travel times via public transit from home to employment opportunities with the magnitude of the opportunity (in this case, number of jobs). LCAS is calculated in a similar fashion, using size of local centers instead of number of job opportunities. For simplicity, SYPTE sets the 2005/06 index score
to 100 for both EAS and LCAS. The targets for these two indicators are the same which is to sustain the average EAS and LCAS for households within Housing Market Renewal/Neighbourhood Renewal/Priority areas, allowing for a slight reduction in the interim. Thus the index score dips slightly below 100 until the final year of the 2nd LTP. It is not readily apparent why SYPTE has chosen the target of maintaining levels of access, although the LTP does mention that recent trends of reduced bus patronage may have a negative effect on the indicator. South Yorkshire is the only PTE that used gravity-based measures to calculate accessibility in its 2nd LTP. This negated the need for thresholds, but while a more robust way to measure accessibility, the EAS and LCAS scores are more difficult to interpret. A score that score that dips from 100 to 98 clearly shows a worsening of accessibility, but it is very difficult to readily identify the amount of change this entails.

South Yorkshire PTE also includes three additional indicators and targets in its accessibility section, including one aimed at maintaining rural accessibility. The indicator SYPTE uses to measure this is “percentage of rural households within 800 meters of an hourly or better bus service” which SYPTE hopes to maintain at 95%. The other two indicators are to “increase the number of cycling trips by 10%” and to “maintain the % of ‘non-car’ journeys to primary and secondary schools at 60 and 82 respectively.” While worthy goals, it is unclear how these will directly benefit socially excluded populations and whether these are truly accessibility measures or measures to reduce congestion or improve safety and physical fitness.

Tyne and Wear

Tyne and Wear PTE uses three accessibility indicators and targets in its 2nd LTP:

- Percentage of households within 20 minutes of closest secondary school
- Percentage of households within 30 minutes of closest hospital
- Percentage of households within 40 minutes of four specific employment sites

The LTP mentions the desire to include an indicator for each of the three key services put forth by DfT, but it does not discuss why these particular indicators were chosen. Tyne and Wear uses its own accessibility model called AutoAccess to calculate public transport accessibility, though it is not clear if the indicators are measuring only accessibility via public
transport or via all modes. The lower thresholds set by DfT were chosen for access to education and health care, but the PTE and its partners felt that 40 minutes was a more reasonable threshold for access to employment.

Figure 4-3 displays the targets Tyne and Wear have set for these three accessibility indicators. The four employment centers are shown separately.

Figure 4-3. Tyne and Wear Annual Accessibility Targets.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Baseline 2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>20 mins</td>
<td>94%</td>
<td>94%</td>
<td>94%</td>
<td>94%</td>
<td>95%</td>
<td>95%</td>
</tr>
<tr>
<td>Health</td>
<td>30 mins</td>
<td>71%</td>
<td>71%</td>
<td>72%</td>
<td>73%</td>
<td>74%</td>
<td>74%</td>
</tr>
<tr>
<td>Employment (Newcastle City Centre)</td>
<td>30 mins</td>
<td>62%</td>
<td>62%</td>
<td>63%</td>
<td>63%</td>
<td>64%</td>
<td>64%</td>
</tr>
<tr>
<td>Employment (Great Park)</td>
<td>60 mins</td>
<td>6%</td>
<td>6%</td>
<td>7%</td>
<td>8%</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>Employment (Team Valley)</td>
<td>40 mins</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>9%</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>Employment (Neuburn)</td>
<td>40 mins</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td>9%</td>
<td>9%</td>
<td>10%</td>
</tr>
</tbody>
</table>

All of the targets increase gradually over time at differing rates. No explanation is given for how these targets were chosen other than the fact that Tyne and Wear would like to see improved access to these three sectors. It would be helpful to have a better understanding of how transport improvements planned in the 2nd LTP might contribute to these targets, particularly when there is a different targeted rate of increase for the same indicator as shown in Figure 4-3. It should also be noted that Tyne and Wear is the only PTE that does not include specific groups or areas in its accessibility indicators meaning that overall accessibility improvements would not necessarily reflect improvements for the socially excluded.

**West Midlands**

West Midlands PTE utilizes a large number of different accessibility indicators for four key services: health, employment, education, and fresh food. However, the LTP only includes three targets:

- Indicator 1: Increase the number of people attending job interviews per year via access initiatives from the 2005 baseline of 1150 to 2300 by 2010.
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- Indicator 2: Increase the total population within 30 minutes inter-peak travel time of a main NHS hospital by 'accessible' public transport from the 2005 baseline of 580,000 by 50% by 2011

- Indicator 3: Support economic regeneration by maintaining inter-peak accessibility to the 9 LTP centers as a whole between 2004/5 and 2010/11

Indicator 1 is the most interesting because it is an indicator of an outcome, namely increased job interviews. It is also interesting because it is dependant upon the coordination with other agencies; in this case the work programs JobCenter Plus and WorkWise. These agencies have initiatives to provide free transport to job interviews. The target, while arbitrary, is appropriate as long as funding for these initiatives is available. The LTP indicates that funding such initiatives would be “stretching”, but achievable.

Indicators 2 and 3 are similar to others reviewed in this paper, but the West Midlands 2nd LTP provides much more detail for how these indicators originated than others. The second indicator is one of the only accessibility indicators that use absolute numbers rather than relative ones. It was included because the seven metropolitan authorities in the region agreed that it was a priority and public consultation called for better accessibility to the ten major hospitals in the West Midlands region. The 30 minute threshold came from market research that found 30 minutes to be an acceptable travel time to get to a hospital. The target is tied into the specific, feasible improvements in the public transport system that is outlined in the LTP.

Indicator 3 is similarly well described and justified within the plan. An LTP center is one of nine employment areas that the West Midlands Regional Spatial Strategy has prioritized including regeneration zones and technology corridors. The target focuses on inter-peak times because they determined that this was when the majority of shoppers and commercial enterprises do business. This indicator is monitored by calculating the number of residents within 15 minutes car travel and 30 minutes public transport of the nine LTP centers. These isochrones were chosen because they roughly equate to the boundary of the West Midlands County. The reason that West Midlands aims to maintain the overall inter-peak accessibility is because they expect an increase in auto congestion during the course of the 2nd LTP.
period, but an improvement in some auto and bus networks which should help negate contracted isochrones that auto congestion will create.

West Midlands provides an excellent case study for how accessibility indicators should be developed and explained in Local Transport Plans. The plan makes it very clear where the impetus for the indicators originated and uses data and plan initiatives to justify the thresholds and targets that are set for these indicators. Indicators 1 and 2 smartly include absolute numbers in their targets which gives the public and policymakers a sense of not only the percentage change, but also how many people will be affected by this change. While West Midlands does not use gravity-based measures, the number of main hospitals and employment centers are limited and fairly widely-distributed, it is not unreasonable to assume that these destinations be equally weighted.

West Midlands also provides helpful charts and maps to illustrate the effect of reaching their targets. **Figure 4-4** displays two maps of the results of the access to hospitals indicator, the one on the left is the baseline result and the one on the right is the targeted result.

**Figure 4-4. West Midlands Access to Hospitals (Baseline and target)**

![Figure 4-4](image)

*Note: The blue regions represent areas within a 30 minute travel time of a hospital.*

**West Yorkshire**

Despite the use of DfT’s core indicators to assess their current state of accessibility for the transportation disadvantaged, West Yorkshire PTE only includes one target in its 2nd LTP. The plan does note that other targets will be used in the future, but that further investigation would be needed before coming up with meaningful targets. In partnership with health authorities, West Yorkshire identified the reorganization of the health care system in the
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region as having a potential negative impact on accessibility which led to the following indicator and target:

- Ensure that 89.5% of households without access to a car are within 30 minutes of a hospital by public transport by 2011

89.5% is the baseline percentage, so this indicator aims to maintain that baseline figure, though the 30 minute threshold is not explained in the LTP. The feasibility of this target seems pretty high because achieving it mostly hinges on making sure that accessibility is one of the criteria that health authorities consider in their reorganization.

Summary
Despite such prescriptive guidance from the UK federal government, there are still many variations in the accessibility indicators PTEs use and the way they are presented in their 2nd Local Transport Plans. While many of the PTEs did a better job of describing how certain indicators were chosen and thresholds were set than their US counterparts, some still did not justify their decisions and it was sometimes unclear how the indicators would help the socially excluded at all. Only South Yorkshire chose to use gravity-based measures.

Target setting was often fairly arbitrary. While it is true that targets will be easier to set once there is better historic data for the selected indicators, it would be more meaningful if PTEs used transport improvements from the LTP to base these targets upon. In many ways, the UK transport plans have the opposite problem from US plans. PTEs do a reasonably good job relating accessibility measures to specific action initiatives in the LTP, but do not show how the plan constrains the accessibility targets. Federal guidance actually suggests this as a tactic to set meaningful target thresholds: “One way to develop a realistic and achievable target is to model or quantify the accessibility benefits of the various policy interventions under consideration to investigate the improvement that can be achieved.” (DfT(d), 2006)

West Midlands PTE provides an excellent example of showing how its targets are both optimistic and achievable according to the plan’s initiatives.
Other Important Methods

While accessibility indicators should continue to be developed in the assessment of the accessibility needs of the transportation disadvantaged, technical analysis can only go so far. Other methods, both quantitative and qualitative, should also be used by transport agencies to assess these needs. Three of the most important techniques are briefly described below: public participation, community surveys, and inter-agency partnerships.

Public Participation

Public participation is playing an increasingly important role in the transportation planning process, particularly for the transportation disadvantaged. The needs of these groups have traditionally not been fully recognized which is why engaging them in the process is so vital. While accessibility indicators are an important tool to help target specific areas and groups and to monitor the progress of initiatives aimed at improving accessibility, they cannot replace input from the people who are facing barriers to access to key services and opportunities. To be effective, public involvement should be incorporated into every aspect of the accessibility assessment process from determining what barriers exist to prioritizing initiatives and shaping the accessibility indicators, thresholds, and targets.

Department for Transport’s guidance on accessibility planning includes a section on the role of community involvement in the process. The guidance makes the point that consultation with “hard to reach” groups is particularly important because they have often been ignored in the past (DfT(a), 2006). DfT makes very specific suggestions for how to involve the socially excluded including taking anonymous trips to neighborhoods and encouraging the use of local interviewers and recruiters to help with cultural differences including language (DfT, 2000). The guidance recommends the use of different types of public consultation at different stages of the process. Broad consultation is recommended for identifying priorities, whereas more direct, focused consultations should be undertaken to “reality check” proposed actions (DfT(a), 2006).

Despite this guidance, some researchers feel that the UK government can do more to include the public in the effort to reduce social exclusion. Hodgson and Turner (2003) feel that the UK is “not addressing the issue of participation in the decision-making process of
transport operation and management” and that many of the efforts that are currently being made are often seen as tokenism. Public participation is only an effective tool if the tangible results of this participation can be shown.

Public participation is recognized as a vital aspect of the transportation planning process in the US. One of the fundamental environmental justice principles that FHWA identifies is: “To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.” (FHWA, 1998) MPOs often include specific sections on public involvement in their long range transportation plans. However, the emphasis on public participation is still fairly new and MPOs had not historically spent a lot of energy on this aspect of the process (Sanchez and Wolf, 2005). The emphasis on meaningful public participation and finding diverse ways of involving hard to reach citizens must continue to be developed.

Community Surveys
Community surveys are often used to “ground-truth” existing data and focus efforts on particular areas or groups. The data sources that transport agencies must use to assess the needs of the transportation disadvantaged are often quite dated. Surveys have the advantage of providing current information and if properly conducted, can accurately capture transient populations that may have been undercounted in Census data. They can also expound upon existing data to provide a fuller picture of the needs and desires of a community. Depending on the situation, surveys can be conducted by local transport planning organizations, the agency in charge of a specific transport project, concerned non-profit organizations, or academic institutions.

Community surveys are not appropriate or feasible for every situation. They can be expensive and time-consuming ventures and require a good deal of coordination. Because the communities that these surveys often target have traditionally been left out of the transportation planning process, they may be reluctant to participate if they feel that the results of the survey will not be used in a meaningful way. Surveys can also be implemented at various stages of the transportation planning process, such as the development of long
range plans. However, most of the examples of surveys used in the US originate as part of an assessment of the effects a specific transport project may have on a particular community.

An example of a community survey developed by the UNC Center for Civil Rights for a community can be found in Appendix A. This particular survey does not include many questions about the community’s accessibility needs, but it does ask how residents get about town. More detailed accessibility questions can easily be built into a community survey. Friedman created a landmark survey in 1978 for the Crest Street neighborhood in Durham, North Carolina (Friedman, 1978). Many of the residents in the neighborhood would have been forced to move because of a highway that was scheduled to be built through the community. Friedman’s survey was instrumental in the successful relocation of the entire neighborhood to an adjacent tract of land because it not only showed the tremendous social cohesion within the neighborhood; it also showed that the physical location of the neighborhood was critical for its residents. Many worked within walking distance of employment, the local church and a grocery store. This fine-grained information would have difficult to obtain using traditional data sources.

Inter-Agency Partnerships

A broad understanding of the accessibility needs of the transportation disadvantaged requires more than simply considering the barriers that the transport network creates for certain individuals and groups. Establishing partnerships with other government agencies and non-profit organizations that focus on particular needs such as health care, education, and employment is vital to improving accessibility to these types of services. DfT’s accessibility planning guidance encourages transport agencies to build accessibility planning into existing partnerships. If such partnerships do not exist, DfT encourages transport agencies to demonstrate to other agencies “how accessibility contributes to delivery of their aims and objectives.” (DfT(a), 2006) These partnerships should play a role in all stages of the accessibility planning process from identifying socially excluded populations to monitoring the progress of specific policies aimed at these populations. The 2nd Local Transport Plans reviewed in this paper stressed these partnerships and often demonstrated how these partnerships had played a role in the identification of target populations and the development of accessibility indicators.
Church et al. (2000) point out that “accessibility is only one aspect of the transport related causes of social exclusion, and the existence of a high level of accessibility does not necessarily imply that people are able to benefit from it.” A multi-agency approach is recommended to identify and address all of the reasons that the transport system may exclude certain individuals and groups from fully participating in society. These reasons include the location of these services and opportunities and the ways in which services have been designed and delivered.

With the exception of specific programs such as Welfare to Work, there is virtually no mention of inter-agency partnerships in US federal guidance on environmental justice or the EJ sections of the long range transportation plans reviewed in this paper. This only reiterates the lack of commitment transportation agencies in the US have made to the accessibility needs of EJ populations. Until a comprehensive approach is adopted, policies that tackle accessibility issues faced by EJ populations solely from a transportation standpoint are not likely to succeed.
5 Conclusion

There have been recent efforts in the United States and United Kingdom to identify and assess the accessibility needs of the transportation disadvantaged in each country. In the US, a handful of MPOs have begun including accessibility assessments in their transportation planning process, though these efforts are still very much in their infancy. The UK, on the other hand, has embarked on a comprehensive and ambitious program to reduce social exclusion. This program is aimed at a number of different sectors including health care, education, and employment. The focus for the transport sector has been on improving accessibility to key services for its socially excluded citizens. The attempt to identify and assess the accessibility barriers that certain individuals or groups may experience poses many challenges.

The first challenge is deciding how to identify who is experiencing accessibility barriers. Many of the long range transportation plans in the US that were reviewed in this paper simply identified environmental justice populations, which are defined as low-income and/or minority populations. Some attempted to identify additional groups such as the elderly or no-car households. Determining these groups first simplifies the process, but it ignores the potential accessibility issues of other groups not strictly defined as EJ populations. In addition, because EJ populations are compared to the general population, decisions must be made about what constitutes the study population, reference population, and thresholds at which EJ populations are given special consideration. These definitions were radically different for different regions and most seem to have been chosen arbitrarily. MPOs should conduct a sensitivity analysis for each threshold chosen and report the results of this analysis in their long range plans. Without such analysis it is impossible to judge the strength of the evidence they present.

Regional transport agencies in the UK take a very different approach to the identification of groups that experience accessibility problems. PTEs try to base their determinations on evidence provided by surveys, the Index of Multiple Deprivation, or DfT’s core accessibility indicators. While this is preferable to the US approach because it bases decisions on actual
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evidence rather than predetermining which groups experience accessibility problems, PTEs must still set thresholds to determine where to focus their efforts. With the exception of West Midlands, these thresholds are also set without any justification in the 2nd Local Transport Plans and without a sensitivity analysis.

This arbitrariness extends to the use of accessibility indicators in both countries. Accessibility indicators are used in regional transportation plans to “quantify accessibility and assess the ease with which an individual, population segment or community can access one or more services from a residential or other location using available modes of transport.” (DfT(d), 2006) Many decisions must be made with regard to the use of accessibility indicators including what opportunities and services are most important to address, which indicators best measure the accessibility to these opportunities, and how to set thresholds and targets. With the exception again of West Midlands, it was not readily apparent from the plans how these decisions were made in each region. The US plans have the additional problem of not even setting targets for their accessibility indicators and drawing incomplete conclusions from their indicators. There are several ways to address these issues.

The first way to reduce the arbitrariness of these decisions is to simply describe and justify the decisions that are made in the plans. It is possible that some of the decisions that were made by MPOs and PTEs were based on appropriate analysis, but the results of this analysis were not included in the plans. If this analysis was not conducted, making it a habit to include an explanation of the choices that were made should prompt the agency to address this problem through a sensitivity analysis or develop a new threshold through empirical evidence. At the very least, the thought process that went into making a specific decision should be made explicit in the plan so that readers can judge for themselves whether or not they feel that the use of an indicator, its threshold, or its target is appropriate.

Another potential improvement is to consider using more advanced accessibility measures. Most of the agencies used isochronic opportunity measures in their analysis which is the most basic, though easiest to interpret, accessibility measure. Two MPOs used some form of gravity-based measure, while only one PTE did likewise despite the Department for Transport’s assertion that these types of measures provide more robust results (DfT(d),
2006). Other agencies should consider the use of gravity-based measures to strengthen their results. These measures also do not necessitate the creation of artificial thresholds, which as has been shown, can be quite challenging. However, gravity-based measures also require that some decisions be made about the appropriate weights to use and the results need to be thoroughly explained to the public in the plan. Utility-based measures and constraints-based measures should also be considered if the data and expertise is available to calculate them. These measures capture even more variables than gravity-based measures such as individual travel choices and time constraints, but it may be difficult to translate these measures into interpretable results.

Regardless of the type of accessibility measure used, regional transportation plans must demonstrate how these indicators will be used to help formulate the actions that will specifically address the accessibility needs of the transportation disadvantaged. In US plans, the difference in accessibility was calculated given a comparison of a no-build scenario and build-out scenario. While these results show how the plan affects accessibility, no targets are set for the indicators and there is no specific information about how the results of these indicators will inform the plan itself. UK plans do a better job of showing how the accessibility indicators chosen relate to specific initiatives in the plan, but with a couple of notable exceptions, do not show how these initiatives constrain the targets that are set. For accessibility indicators to be truly effective, a feedback loop must exist whereby it is demonstrated how indicators inform the action items in the plans and how these action items inform the creation of meaningful indicators and targets.

The West Midlands LTP provides the best case study on the use of accessibility indicators. The indicators used are very specific and focus on the larger objectives of the agency, including one indicator that is outcome-based. The goal of accessibility planning is to minimize the social exclusion of its citizens, so an indicator that sets a target for how the transportation sector can help increase opportunity is exceptional. West Midlands does an excellent job justifying the thresholds that are set for the indicators. They also demonstrate how the targets that are set are constrained by the action items in the plan, particularly in terms of their fiscal feasibility. The indicator thresholds and targets are well presented in the plan through helpful maps and charts. The indicators West Midlands uses could be
strengthened by the use of more advanced accessibility measures such as gravity-based measures, though the destinations chosen for each indicator would probably be weighted about the same.

The West Midlands LTP is also exceptional because it demonstrates how important inter-agency partnerships are in helping to shape the development of the indicators. These partnerships are stressed by the UK government, but are not yet a major part of the way US transportation agencies approach accessibility assessments. Public participation is also a crucial aspect of the process because the accessibility needs of the transportation disadvantaged are best understood by the individuals and groups who encounter barriers in the transportation system. Community surveys can also be important tools to understand accessibility issues at a sub-regional level. Accessibility indicators should be used as a tripwire to notify authorities that an accessibility problem may exist and help them monitor the progress of their actions, but there is no substitute for engaging the people and local agencies that best understand the obstacles the transportation disadvantaged face.

Above all else, the best way to address the accessibility needs of the transportation disadvantaged is to make it a priority and keep refining the techniques used to assess it. The UK is on the right path because accessibility planning is an explicit policy of the federal government and social inclusion an expressed goal. However, political winds can shift, so steps should be taken to ensure that it remains a permanent fixture in the transportation planning process. The US has yet to make improving accessibility for the transportation disadvantaged an explicit goal, though some regional agencies have taken the first step by including an accessibility assessment in their planning process. US agencies would be wise to incorporate the evidence-based approach that the UK promotes. Empirically-sound evidence will ultimately determine whether improving accessibility for the transportation disadvantaged is possible, if this improvement can actually increase social inclusion, and ultimately, if accessibility planning is a worthwhile venture for transportation planning agencies.
Appendix – UNC Center for Civil Rights Survey Template

Template for Comments Opposing By Pass
Prepared by UNC Center for Civil Rights, September 2006

Individual Characteristics

1. Name:
2. Age:
3. Physical Address:
4. Mailing Address:
5. Work:
6. Work Address:
7. Race:
8. How long have you lived in the community?
9. Family in your home?
   a. How many?
   b. Who?
10. Family in Neighborhood?
    a. How many?
    b. Who?
    c. When do you see them?
    d. What kinds of things do you do together?
11. Do your own your home?
    a. Recent Improvements?
    b. What type of work do you do to maintain it?
12. If the corridor is constructed, do you know if your house will stay standing or if it will be demolished?
    a. If standing, what do you look at now that won’t be there?
    b. If demolished
       i. Where will you move?
       ii. Will your kids have to change schools?
       iii. How much will it cost to move?
13. How do you get around town?
    a. Are you able to walk most places you need to go?
    b. Do you carpool with neighbors?

Neighborhood Cohesion

1. How many people live in your community?
2. Are there any churches?
   a. How old are they?
   b. How many people attend?
3. Are there any parks/recreational facilities?
4. What civic organizations exist there?
   a. How many?
   b. Which are you involved in?
5. How many people are elderly?
6. Are there any small businesses in the community?
   a. Where do you do your shopping?
7. Do most people walk or drive?
8. Is there a public school?

Follow Up:

1. Do you know anyone who can talk about community history generally, e.g. When was it started, what were key points in the community’s history?
References


Gudmundsson, H. (2001) Indicators and performance measures for transportation, environment and sustainability in North America, National Environmental Research Institute, Roskilde, Denmark http://www.dmu.dk/1_viden/2_Publikationer/3_arbrapporter/default.asp

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