

Sidewalk Accessibility, Sidewalk Justice
Conceptions of Equity in Cities' Prioritization
of Pedestrian Accessibility Improvements

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Abstract

The Americans with Disabilities Act (ADA) requires that pedestrian public rights-of-way, where provided, be accessible to people with disabilities. Yet the cost of making the existing pedestrian network accessible is too high to undertake all at once. Local governments must prioritize their efforts, which necessarily involves decisions about what distribution of resources is equitable and fair. Various traditions of thinking about disability and the sidewalk influence decisions by providing preconceived ideas of equity. I propose a taxonomy of equity conceptions that are relevant to prioritizing accessibility in the pedestrian network, which I use to analyze the results of a survey given to officials in cities and counties throughout the United States. I find that local governments' prioritization strategies are most strongly influenced by the principle of adequacy, by the principles of proportionality to population, advocacy, and preferences, and to a slightly lesser extent by the principle of equal opportunity.

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Introduction

Every day, city and county officials make decisions that affect who benefits from local government services and how much. Whether acknowledged consciously or not, these are decisions about fairness. To make a decision about who benefits is to make a decision about who deserves to benefit and why. Local policymakers are thus not only choosing a distribution of services and benefits, but also choosing a concept of distributive justice. Since at least the 1970s, numerous political scientists (e.g. Lineberry and Welch 1974; Stone 1997) as well as planners (e.g. Litchfield 1977; Crompton and West 2008) have analyzed the implicit and explicit equity implications in the distribution of various local government services. This thesis applies this tradition of research to the equity implications of how local governments in the United States attempt to provide pedestrian public rights-of-way that are accessible to people with disabilities.*

Public rights-of-way for pedestrian use include sidewalks along streets and crosswalks across streets as well as off-street paths, such as pedestrian malls or pathways in parks. Historically, much of the pedestrian network has been constructed and maintained with the abilities and dimensions of typical adults in mind. As a result, routes can be difficult to navigate or completely inaccessible to

* As with many terms used to identify social groups, there is debate about the most appropriate terminology to use when referring to people who have disabilities (see e.g. Russell 1998, 13; Gleeson 1999, 9). Without taking a position in this debate but with the utmost respect for the people referred to, this thesis follows the most common current usage and uses variations of the term “people with disabilities.”

people with a range of disabilities, including not only people who use wheelchairs but also the blind, people who have difficulty walking without support, or people who have trouble with spatial orientation and navigation. This range can even include people who are not normally thought of as having disabilities but nonetheless are not served by the existing pedestrian network, including small children or parents with strollers.

The topic of the accessible pedestrian network is useful for investigating equity in local government for at least two primary reasons. First, policies toward the accessible pedestrian network lie at the intersection of diverse, overlapping traditions of theory and practice, including the disability rights movement as well as the use of the sidewalk for transportation, political expression, and social interaction. Each of these traditions of theory or practice brings with it particular notions of fairness and equity. When a local official or resident looks at a particular policy toward pedestrian accessibility and considers whether the policy is right or fair, she draws on the notions of fairness that have been embedded in the theoretical or practical traditions with which she is the most familiar.

Because of its many antecedent traditions, the accessible pedestrian network is a particularly legible case of a truth about concepts of justice: there is more than one idea about what is just. Justice and equity are not unitary concepts with one definition that all agree on. Rather, any society will have multiple competing conceptions of equity. Local policymakers choosing among possible distributions of services are not simply choosing distributions that are less or more just or unjust. They are choosing from among different ideas of what justice is. By

offering such a rich array of options for policymakers, the accessible pedestrian network also offers researchers a rich environment to analyze how these concepts of equity are put into practice.

The second primary reason why the accessible pedestrian network is a fertile topic for investigating equity is because constrained resources force hard decisions. There are as many different reasons to make the pedestrian network accessible as there are different theoretical and practical traditions that address the topic. In civil rights, an accessible pedestrian network secures the right that people with disabilities have to “live in the world” (tenBroek 1966), move about and be a part of the world. In public health, an accessible pedestrian network enables walking and exercise to become a daily part of more people’s lives. In public safety, accessible pedestrian routes protect more pedestrians from traffic accidents and injury. Under the Americans with Disabilities Act (ADA) and similar state regulations, public entities are required to provide accessible routes across the entire pedestrian network throughout their jurisdictions. As long as there are inaccessible pedestrian routes in its jurisdiction, a local government is vulnerable to private lawsuits, federal or state enforcement, and potential loss of federal funding. In a situation of enough abundance, it might be possible to achieve all of these goals, and more, without needing to make any significant trade-offs. If it were possible to achieve all of the goals, the choices among different concepts of equity would not be apparent. In reality, resources are very constrained.

Since cities, counties, and other local governments are responsible for constructing and maintaining public rights-of-way, it falls to them to make sure

that the pedestrian network is accessible to as many people as possible.

Unfortunately, decades of building for the most able adults has meant that much of this network in every city is not accessible. In addition, steep topography and narrow rights-of-way can increase the difficulty—and expense—of making routes accessible. Coming against the many reasons to provide an accessible pedestrian network is the extremely high cost of making routes accessible. This is a particularly grave challenge now when funding for all levels of government is decreasing.

Faced with needs that are greater than the available resources, local governments must prioritize which projects they will attempt first. A system of prioritization involves choosing both a distribution of resources among different locations and kinds of capital projects as well as a concept of equity among the many competing conceptions. While a situation of scarcity poses harsh challenges for local policymakers, it also offers researchers a harsh spotlight to put decisions about distributive justice into stark relief.

As a general research topic, elucidating conceptions of equity in government services plays an essential role for justice in a pluralistic democracy. Choices must be made among competing conceptions of equity, and in a democratic society these choices can only be just if they are made openly through the democratic process (Walzer 1983; Crompton and West 2008, 56). That democratic process depends on having both the conceptions of equity and the differences between them clearly shown. This thesis is a very small contribution to a just democratic process, but nonetheless seeks to offer some illumination of

the choices that public officials and citizens must make when prioritizing accessibility improvements to the pedestrian network.

Within the general topic of equity in government services, the accessible pedestrian network is specifically significant because the demands for accessibility in the pedestrian network will grow in coming years. People with disabilities already represent a significant portion of the population, and the proportion is growing. The U.S. Census Bureau estimates that more than 56 million people in the United States live with some type of disability, representing more than 18 percent of the non-institutionalized civilian population (Brault 2012, 4). The importance of accessible streets will only grow as the population ages. The proportion of Americans age 65 and older is expected to rise from 13 percent in 2010 to 20 percent by 2040 (Vincent and Velkoff 2010, 3). Among the elderly population as it is today, approximately 50 percent have some type of disability (Brault 2010, 4), indicating that the number of people needing accessible streets will dramatically increase in the coming decades.

At the same time that the need for accessible streets is increasing, there is a growing interest in pedestrian-friendly and bike-friendly street design among urban designers, planners, and public health workers. This growing interest comes with a recognition that public rights-of-way should not be designed for the convenience of cars only. Various street design movements, from Complete Streets to Woonerven, are reclaiming the idea of the public right-of-way as a shared space for walking and bicycling in addition to driving. As these movements increasingly influence street redesign projects throughout the United

States and the rest of the world, we can expect to see a more important and visible role for pedestrian infrastructure in general. How accessible this infrastructure is for pedestrians with disabilities is a significant question for local governments and becomes more significant the more local governments undertake these pedestrian projects.

I should note here that I do not have a disability and have never identified myself as a person with disabilities. Although I do have close family members with permanent mobility disabilities and others who have had temporary disabilities due to injury, I did not recognize that this connected me to disability until I began research. I recognize that the disability rights motto of “nothing about us without us” suggest that I, an able-bodied person not working in partnership with anyone who has a disability, may not be the most appropriate person to conduct this research at all. Rather, the researcher should be someone who has experienced the disabling effect of an inaccessible pedestrian network. I take the objection seriously, and recognize that I cannot attempt to speak for or represent the wishes of people with disabilities. However, I believe that it is important for people without disabilities also to understand the equity implications of how we provide, or fail to provide, an accessible pedestrian network. Every day, there are people like me without disabilities making critical decisions that profoundly affect people with disabilities and affect how quickly we can achieve an enabling society. Just as it is unacceptable to exclude people with disabilities from the debate, so too is it unproductive to ignore the issue simply because I happen not to have a disability.

The equity implications of the accessible pedestrian network is a rich, and relevant topic. It is also manifestation of issues that go to the root of what the planning profession works to achieve. The accessible pedestrian network is an example of the interface between the physical environment and quality of life for residents. How and where the city pours concrete for sidewalks makes a real difference in the lives of people who need to get around. At its core, planning is about the interrelation of the physical environment and people. Local governments' policies toward the accessible pedestrian network is thus a perfect expression of the core of planning.

Conceptions of Equity

Questions of equity are concerned with the distribution of benefits and burdens in society (Litchfield 1971, 161; Stone 1997, chap. 2; Rawls 1999, 6). We use the term equity to refer to the distribution that we think is most right, proper, and ethical. Equity describes a social distribution that is just, and so in this sense is synonymous with the term distributive justice. Equity, justice, fairness, equality—in normal speech all these terms mean roughly the same thing, and that thing is good and desirable. In moral philosophy, political science, and other fields concerned with questions of distributive justice, however, a clear distinction is drawn between equity and equality (e.g. Stone 1997, chap. 2; Crompton and West 2008, 36). This distinction is contrived, but crucial to answering questions of distributive justice. Equality can be measured and defined mathematically. Equality refers to sameness and uniformity, but makes no claim about the value or desirability of that sameness. Equity, on the other hand, is a moral good that can only be defined with reference to particular values. Equity is the distribution that *we think* is most ethical, and so its definition will necessarily change depending on who *we* are.

For planners and other practitioners in public policy fields, two important points follow from this understanding of equity. First, there are multiple different conceptions of equity. Any question of social distribution will have several—or many—different possible answers for which distribution is the most equitable and why. The fact that there are multiple conceptions of equity does not require us to

hold that all of these conceptions are equally valid. However, to say that one conception is better than another is itself a value judgment, not an empirical judgment. Likewise, to hold that one conception is equally valid as another or as all others is also a value judgment. Whatever our own moral views, the fact remains that other people may have different moral views that shape their understanding of equity differently from our own. The consequence is that we do encounter different conceptions of equity.

Sen (1992) observes that the clashes between conceptions of equity have their cause in the fundamental diversity of human beings. Some of us are old, some young. We have different talents as well as different abilities and disabilities. In addition to differences in ourselves, we occupy different positions in society. Some of us are rich, others poor. We live in different countries with different economies, different legal systems, and different cultures. “It is precisely because of such diversity that the insistence on egalitarianism in one field requires the rejection of egalitarianism in another” (Sen 1992, xi). Fair standards made with certain types of people in mind can become unfair when applied universally.

Conceptions of equity must acknowledge and deal with this human diversity lest their efforts toward equality contribute to inequality even by their own measures. Rawls (1999, 87; 2001, 74) recognizes that the distribution of natural abilities is by itself neither just nor unjust. Rather, it is how social institutions deal with this variation that determines equity or inequity. This observation is particularly relevant to the question of how the pedestrian network should accommodate people with disabilities. Disability or ability is one variable

in the constellation of human diversity, but it is a variable that has a profound impact on what pedestrians need and desire from their sidewalks.

The second important point for planners and other public policy practitioners is that we have a professional obligation to elucidate the values and conceptions of equity that underlie our plans and recommendations. Planners inform decisions that determine distributions in society, and because these decisions determine distributions, they are decisions about equity (Crompton and West 2008, 39). Equity can only be defined with reference to moral values, so the decisions that planners inform are decisions about moral values (Lineberry 1977, 26-27). Because planners inform decisions about moral values, considering values and planning for values are inescapable parts of what planners do. Equity planning is thus an essential part of planning (Low 1994, 116; Lewis 2012, 46). Planning that does not consider equity is simply bad planning, whether or not we consider it morally bad. From this recognition that equity is essential to planning, it follows that planners have a professional obligation to articulate and elucidate the values in their plans (Litchfield 1971, 161; Lewis 2012, 44).

With the understanding that there are multiple conceptions of equity, and mindful of the professional obligation to clearly articulate values, let us turn to an investigation of some of the specific conceptions of equity that moral philosophers have identified.

Classic Conceptions of Equity

Equality

The most basic and familiar conception of equity is the principle of equality. At first look, equality seems to be the essence of fairness. Everyone gets an equal share. The appeal of equality as a principle of justice is strong and possibly universal. Sen (1992) claims that all ethical theories share a core demand for equality. What then explains the diversity of ethical theories and the multitude of possible conceptions of equity? The differences are because different ethical theories focus on different variables by which to measure equality. The relevant question is not for or against equality, but for equality of what (Sen 1992, ix). Lineberry (1977) notes that modern public policy almost never calls for complete equality (28), since this would be impossible. To achieve equality by one measure necessarily means inequality by another measure.

Take for example the decision to install a curb ramp where a sidewalk meets the street curb. Without a curb ramp, pedestrians who use wheelchairs or walkers may not be able to use the sidewalk at all. Equal access to the sidewalk demands that the curb ramp be installed. But the curb ramp is much more of a benefit to pedestrians who use wheelchairs than it is to pedestrians on foot who could just as easily step up an eight-inch curb. The curb ramp might even be an obstacle for people with foot conditions that make sloping surfaces painful to walk on but do not make stepping up a curb any more difficult. Installing the curb ramp would be providing unequal benefits. Strict adherence to equal benefits from each piece of infrastructure demands that the curb ramp not be installed.

Also consider how to pay for the curb ramp. Equality might demand that everyone in the city pay an equal share, through taxes presumably, to cover the cost of installing the curb ramp. But people who work or live in the neighborhood of the curb ramp are much more likely to use the ramp. Equality of cost per use of the ramp demands that people in the neighborhood pay more. Perhaps the greatest share of the cost should fall on people in the neighborhood who use wheelchairs, since they are likely to use the curb ramp the most. But on average, people who use wheelchairs are more likely to be unemployed, earn lower incomes, and hold less wealth than people who do not use wheelchairs. In other words, even an equal share of the cost would represent a larger proportion of the wheelchair-users income than other pedestrians' income. Equal cost as a percentage of ability to pay demands that wheelchair-users pay less.

The principle of equality can be invoked for any variable that it is possible to divide equally. If there are quantities of some item to be distributed, the focal variable of equality can be the quantities of the item itself. At a party, a cake can be divided into slices with equally sized slices for each guest. The cake as a whole is distributed and shared, but each slice is claimed and eaten by only one person. Once a party guest has claimed his share and eaten his slice, none of the other guests can share or eat that same slice. Distributing equal quantities makes sense for private goods. For public goods, however, one person's use or enjoyment of the good does not take away from the use or enjoyment of another person. For example, sidewalks are a public good, since one person walking on the sidewalk does not prevent another person from also walking on the sidewalk.

Some economist and other thinkers (e.g. Crompton and West 2008, 36) make a distinction between pure public goods and impure public goods. Pure public goods, such as the usual examples of air quality or national defense, are presumed to benefit all members of society equally. Impure public goods inherently have to be distributed, so the benefits to different members of society may not be equal. Anything that needs to be sited in a physical location, such as a park or a sidewalk, must be distributed in physical space, making it an impure public good.

It would not make any sense to assign each person in a city an equal length of sidewalk which they would have exclusive rights to walk on or occupy. If we are to invoke the principle of equality, public goods demand that we define equality by some variable other than the item itself. In the examples above, we considered equality of access to use the public good, equality of benefits that individuals get from the public good, and equality of cost burden that individuals pay to maintain the public good.

In public policy, equality is often considered in terms of the variable of opportunity, such as the equality of access in the example above. Equal opportunity is most familiar in the context of employment, where an equal opportunity employer is one who permits anyone to apply and to be considered only on the basis of their ability to perform the job without regard to race, economic background or any other factor. Equal opportunity ensures that everyone has the same access and opportunity to benefit from a particular good (such as a job), but does not guarantee any equality in the outcome of the

distribution. In the case of a job, all applicants have the opportunity to apply, but only one will get the job.

Given the same opportunity, some individuals will be much better able to achieve success than others because of differences in personal attributes and abilities, willingness to strive, education, and social position. We do not all start from the same place, so the same opportunity does not translate into the same chances of success. Rawls (1999) makes a distinction between *formal* equality of opportunity and *fair* equality of opportunity. Speaking in terms of opportunity for employment and positions in society, Rawls defines formal equality of opportunity as when positions are merely “open to those able and willing to strive for them” (57). In contrast, under Fair Equality of Opportunity “those who are at the same level of talent and ability, and have the same willingness to use them, should have the same prospects of success regardless of their initial place in the social system” (63). Formal equality of opportunity works like a checklist: as long as everyone has some ability to participate in the opportunity, there is formal equality of opportunity. Fair equality of opportunity considers the outcome of the opportunity as well, and expects that the results will have shown that people of different starting social positions have had equal success.

Equal opportunity is an example of equality in the means, rather than equality in the ends that people are able to achieve with those means. This contrast is echoed in the differences between equality of inputs and equality of outputs. James Coleman, writing on the subject of equal education in 1968, is credited with first articulating the distinction between input equality and output

equality (Lineberry 1977, 32). Input equality requires, for example, that equal resources be spent to educate each pupil, but does not require that the pupils achieve equal levels of knowledge and skills. Like equality of opportunity, equality of inputs does not guarantee equality in the outcome of the distribution, because the starting position is not the same. Output equality, accounting for differences in starting condition, requires “equality of condition after receipt of service” (Lineberry 1977, 32). Whenever there are different starting conditions, output equality requires input inequality.

Measuring equality of input or output requires that we define what the relevant input or output is. While inputs tend to be defined by time and money, there are many possible outputs that a local government might want to consider. Objectives with clear metrics are necessary to measure output in any meaningful way, yet the ultimate goals of public services are often vague and too general to usefully measure output (Lineberry 1977, 32). Some types of outputs may be readily measurable but do not have a direct relationship with the ultimate goals of the public service. A pedestrian accessibility program might measure output in linear feet of sidewalk or number of curb ramps constructed, but these would be only intermediary objectives toward program goals such as ensuring pedestrian safety or reducing obesity through routine exercise. Recognizing this difference, we can distinguish equality of outputs in services from equality of benefits that individuals or groups enjoy because of those services. Choosing benefits rather than outputs to be the focal variable of equality has the advantage of more closely reflecting the true goals of public services. However, benefits can be much more

difficult to define and measure. Additionally, various public services on their own may have little or no effect on materially improving community conditions.

Considering the situation of vast and deep inequality before we factor in the effect of public services, equal benefits may in fact be impossible to achieve for any given public service by itself. There are some problems that sidewalks cannot solve.

Proportionality

Some measures of equality attempt to achieve equality not by the individuals or group themselves, but rather by attributes or qualities of the individuals. Focusing on the qualities of the participants in the distribution allows us to rank the participants according to how much they show that quality, then give more to people at a higher rank. In other words, such a distribution is proportional to that quality. The principle of proportionality when it aims at equality with respect to a particular attribute is simply the principle of equality by another name. Often, the distinction is a matter of emphasis rather than true difference. However, the principle of proportionality does not require that there be any equality, even of the focal variable. There might be a threshold level of the variable, above which all participants get equal shares and below which participants get nothing. For example, a city that maintains a sidewalk condition index could spend its entire sidewalk repair budget each year only on complete reconstruction of the 20 sidewalk segments that are in the worst condition.

Aristotle noted the difference between proportionality and direct equality, distinguishing between measuring absolute portions and relative proportions of a

distribution (Lewis 2012, 48). When measuring absolute portions, equity demands that everyone's portion be absolutely equal. With relative proportions, equity instead demands unequal portions that are proportionally equal relative to some other characteristic of individuals. Stone (1997, chap. 2) uses different language to describe the same distinction, contrasting horizontal equality and vertical equality. Horizontal equality demands equal treatment for people of the same rank, in other words absolute portions and direct equality. On the other hand, vertical equality demands unequal treatment for people of different ranks. In other words, vertical equity demands relative proportions determined by some criteria of social ranking. Like direct equality, proportionality can be invoked for as many different qualities as it is possible to measure.

Just Inequality

Equality and proportionality both attempt to reduce inequality by some measure. Other conceptions of equity endorse certain types of inequality. Three types of these conceptions call for our attention here. The first of these is the principle of utilitarianism. Under utilitarianism, the goal is not equalization according to some variable, but rather the maximization of that variable across all individuals in society. Inequality is permitted, and in fact desirable, so long as that inequality leads to a greater net total balance for society in aggregate.

The focal variable in utilitarianism is called utility, hence the name of the principle. But the definition of utility has changed over time and differs among different theorists. The principle of utilitarianism has its origins in the work of Jeremy Bentham and was further refined by John Stuart Mill. Notwithstanding

differences between their two approaches, both theorists conceived of utility in terms of mental achievements such as pleasure, happiness, or a feeling of satisfaction (Sen 1999, 56; Crompton and West 2008, 46). Modern conceptions of utilitarianism tend to define utility by actual fulfillment of individual preferences or desires, rather than by the changeable mental states that the fulfillment provides. Modern utilitarianism seeks to maximize aggregate satisfactions, where satisfaction is the achievement of a personal preference or desire and not merely the feeling of satisfaction that comes with that achievement (Sen 1999, 56). Like the multitude of conceptions of equity, utilitarianism can only make sense in the context of great human diversity. Because people have different internal and social characteristics as well as different preferences and desires, different distributions of finite resources can produce very different aggregate levels of satisfaction.

Utilitarianism is an expression of the principle of efficiency, because it seeks to maximize the output of satisfactions given a certain input of resources. The question of efficiency is often seen as distinct from the question of equity. Litchfield (1971, 161) contends that every issue of distribution must be evaluated in terms of both the “efficiency criterion” (what will cost the total community the least and benefit the total community the most) and the “equity criterion” (how the costs and benefits are distributed in society). For Litchfield, both criteria can be measured and analyzed by economists or land planners, but while the specialist is able to identify the most efficient distributions, choosing the more equitable

distribution is necessarily a judgment about values and can only be properly made through the political process.

I include utilitarianism here as a form of equity because it is often invoked and used not merely as a technical measure but as a moral goal. As Rawls notes (1999, 20) utilitarianism claims that “society is rightly ordered, and therefore just, when its major institutions are arranged so as to achieve the greatest net balance of satisfaction” (Rawls 1999, 20). Furthermore, even if the efficiency criterion and equity criterion are considered different parts of the decision-making process, there are constant trade-offs between the two which can only be resolved with reference to moral values and ideals of equity (Sen 1992, 144).

A second type of just inequality is the principle of redress. According to the principle of redress, members of society who are disadvantaged in some way deserve preference and compensation in all other distributions. In this conception, “undeserved inequalities call for redress” (Rawls 1999, 86). The principle of redress attempts to compensate for inequalities in one sphere by mandating opposite inequalities in another sphere.

By seeking to overcome inequalities in the starting position, the principle of redress is similar to the principle of equal benefits, which also calls for unequal inputs. The difference between redress and equal benefits may be a matter of emphasis, but can lead to distinct differences in distribution. While the principle of equal benefits requires that equality be achieved by some measure, the principle of redress allows for inequality in the outcome. The outcome inequality endorsed by the principle of redress may be more favorable to the previously

disadvantaged individuals or groups, trading inequalities that are deemed to be undeserved for inequalities that are justified by past discrimination. In practice, however, a particular public service is often unable to fully compensate for all existing inequalities. Instead, the distribution of the public service favors the disadvantaged while accepting that they will still be disadvantaged in the final outcome. Lineberry (1977, 34) calls this pseudo-compensation, in contrast to the pure compensation called for in the principle of equal benefits.

The third principle of just inequality is what John Rawls identifies as the difference principle. In his landmark *Theory of Justice* (1971; revised in 1999), Rawls develops a complex equity system of layered principles based on what would be fairly agreed among individuals in a hypothetical “original position” (Rawls 1999, 11). In the original position, a powerful thought exercise, members of society have individual characteristics and different social statuses, but no one knows in advance what any individual’s status is, even his own status. Individuals in this hypothetical original position would be sensitive to efficiency, since without knowing their own position individuals would see the value in increasing aggregate benefits. At the same time however, Rawls assumes that not knowing their own status would make individuals very adverse to risk, since no individual could guarantee to herself that she would not be the most disadvantaged. For this reason, Rawls argues that individuals would be unwilling to endorse any arrangement that left the least advantaged any worse off than necessary. Likewise, individuals in the original position would be unwilling to

support the principle of redress, since they might also find themselves counted among the most advantaged.

Based on his understanding of how people would reason in the original position, Rawls rejects both pure utilitarianism as well as equality or redress that ignore the aggregate benefit. Instead, Rawls proposes the difference principle, under which “social and economic inequalities are to satisfy [the condition]... that they are to the greatest benefit of the least-advantaged members of society” (wording from Rawls 2001, 43; see also Rawls 1999, 266). Inequalities are acceptable only to the extent that, and only so long as, those inequalities increase overall aggregate benefit so that, like a rising tide lifting all boats, the benefit to the least advantaged is greater than if those inequalities were eliminated. “Those who have been favored by nature, whoever they are, may gain from their good fortune only on terms that improve the situation of those who have lost out” (Rawls 1999, 87).

Within Rawls’s theory of justice, the difference principle is only one of several prioritized principles for how to justly distribute what Rawls calls primary goods. Primary goods are the common set of goods that all individuals need in order to fulfill their status as fully cooperating members of society (Rawls 1999, xiii). Together, the prioritized principles constitute a just society. For example, the difference principle has lower priority than the liberty principle, which holds that everyone is entitled to equal basic rights, regardless of their personal characteristics or position in society (Rawls 1999, 266). Thus, in Rawlsian justice, the difference principle applies only to a particular subset of primary goods,

namely social and economic advantages (Van Parijs 2003, 202). This opens the possibility that Rawls would not consider the difference principle appropriate to public services such as the pedestrian network. Although Rawls does outline the principles and process that a just society should use to determine what are to be considered primary goods, he does not directly address the question of how pedestrian accessibility would be treated in a just society. We might consider pedestrian accessibility to be fundamental to basic rights, in which case it should be governed by the liberty principle. Or we might consider pedestrian accessibility to be a secondary good, that is, a good that only some people desire and that is not necessary to be a fully cooperating member of society. In this case Rawlsian justice would not apply. However, as a conception of equity, it is possible to isolate the difference principle and apply it to all manner of social goods and situations, even in ways that would be incompatible with Rawlsian justice.

Equity in the Provision of Public Services

How are the many possible conceptions of equity invoked or followed in real cases? In particular, what conceptions of equity guide local governments in their provision of public services? Observations of how actual city governments have dealt with these questions suggest several more conceptions of equity, in addition to the varieties of equality, proportionality, and just inequality outlined above.

In a theoretical paper proposing a framework for social science inquiry into the distribution of urban public services, Lineberry and Welch (1974) identify

four possible distributional standards: adequacy, input equality, output equality, and efficiency (708-711). Of these, adequacy is the new addition to our list. Under the principle of adequacy, a minimum acceptable standard is set, which then must be provided to all individuals or at all locations. Lineberry and Welch dismiss adequacy as “trivial” and as useful a guide to measuring service distribution as “a liquid yardstick” (708), since any level of service could be defined as adequate by someone. However, they concede that adequacy is a “common” standard, and in fact is a legally enforceable standard. Case law dating back to the eighteenth century holds that particular municipal services, such as a pedestrian network, may be optional, but once offered must be provided adequately to all (Lineberry 1977, 43).

Lineberry and Welch discuss efficiency in both theoretical and administrative aspects. Theoretical efficiency, as discussed above, seeks to maximize the aggregate benefit across all members of society. Administrative efficiency, as explained by Lineberry and Welch, is a practical application of the theoretical concept. Essentially administrative efficiency is “getting the most output from the least amount of input” (710). While utilitarianism and other types of theoretical efficiency look at the aggregate inputs of resources and outputs of satisfactions across society, administrative efficiency looks narrowly at the inputs and outputs for a particular service. Lineberry and Welch point out that a number of different distributions can be efficient by this standard, and choosing among them requires appeal to some other standard of equity. For this reason, administrative efficiency cannot truly be considered a conception of equity.

However, like adequacy, it is often invoked as a standard for local governments to choose among possible distributions of local public services.

Lineberry went on to apply portions of this framework to a study of the public services in San Antonio (1977). Investigating the distribution of benefits and costs of public services in San Antonio, Lineberry found that public service provision was remarkably equal, despite stark inequalities in the distribution of private goods and services. His evidence allowed Lineberry to reject the “underclass hypothesis,” which predicts less burden and greater benefit for Anglos, the wealthy, and the politically well-connected compared to Latinos, Blacks, the poor, and other politically powerless groups (101). Instead, he found some support for the “ecological hypothesis,” which predicts less burden and greater benefit for older, more established neighborhoods with high population density.

More than the ecological explanation, however, Lineberry found that the distribution of burdens and benefits was driven most by “bureaucratic decision-rules.” Decision-rules derive from the cumulative effect of “street-level” bureaucrats using personal discretion to decide which of a set of existing rules should apply to each specific case (155). Bureaucracies are relatively insulated from external pressures (154), but are sensitive to demand, professional norms, expressions of need, appeals for equality, and political pressure (156-158). From Lineberry’s qualitative observations about bureaucratic decision-rules, it follows that the distribution of local government services will correspond most closely to the conceptions of equity implicit in these factors. Demand, need, and political

pressure suggest the principle of proportionality based on these factors. Appeals for equality, of course, suggests the principle of equality in some form. Professional norms, on the other hand, emphasize the role of adequacy and administrative efficiency.

Lineberry and Welch are both political scientists, but planners around the same time were also considering the equity implications of local government services. Lucy (1981) offers a model of service distribution and recommendations for applying conceptions of equity to planning, then demonstrates the model and recommendations in the choice of where to locate public parks. In particular, Lucy recommends five conceptions of equity that he feels are most relevant to planning issues. The five are equality, need, demand, preferences, and willingness to pay. Aside from equality, which Lucy notes can encompass many different principles depending on what the focal variable of equality is (448), the other four are examples of proportionality.

Demand, preferences, and need are related concepts, and all are possible variables for the principle of proportionality. In Lucy's conception, demand is the subset of preferences that are expressed. Demand is manifested, and can be measured, either through demonstrated use or through complaints and requests for services (449). Preferences, because they are not expressed through use or political advocacy, are harder to measure. Lucy lists hearings, citizen committees, and surveys as methods that planners use for measuring preferences, but notes that each has limitations (450). In contrast to demands and preferences, which are what individuals recognize that they want, needs are of course what individuals

actually need, whether they realize their own need or not and whether meeting the need is enough to fulfill their preferences or not. Because needs may not be expressed in demands or revealed in preferences, Lucy explains that planners must have metrics to evaluate the actual needs for various public services (449).

Although not one of his recommended conceptions of equity, the principle of adequacy does come up in Lucy's discussion of need. He states that incorporating need "would be based on a belief that a minimum threshold of adequacy... could not otherwise be met" (455). If adequacy cannot be met, policymakers must turn to other standards of equity in order to prioritize what to fix first. In situations of scarcity, adequacy must be supplemented by more solid guides for equity.

Willingness to pay, Lucy's fifth conception of equity, is a standard from the private market. Under this principle, goods are offered at certain prices to anyone willing and able to pay that price. Lucy concedes that willingness to pay is impossible to implement for some public goods, including access to the sidewalk, and would face outrage if applied to other public services, such as rental fees at public libraries (451).

To test the extent to which his model and recommendations were already being used, Lucy interviewed nine park administrators, asking them to rank possible standards in order of influence on their decisions about siting parks (455). Requests were generally the most influential, followed by industry standards of minimum distances to parks and minimum number of acres per person. Lucy analyzes these industry standards as expressions of the principle of

equality, but they can also be analyzed as expressions of adequacy. Least influential for these nine park administrators were the proximity of low-income populations (as a metric of need) and use (as a metric of demand).

More recently, Crompton and West (2008) offer a well-developed catalog of conceptions of equity. Based on a previous taxonomy of equity by the same Crompton and a different coauthor (Crompton and Wicks 1988), Crompton and West revisit the classifications of equity and respond to criticism and scholarship in the intervening years. After introducing and explaining a taxonomy of fourteen operational strategies for allocating resources categorized as belonging to six different moral philosophies (44), Crompton and West illustrate the operational strategies in the hypothetical scenarios for acquiring and developing public parks (52-54).

Crompton and West's taxonomy echoes the categorizations by Lineberry, Welch, and Lucy discussed above. They cover the principle of redress, labeled as a strategy to favor the "economically disadvantaged," although they misidentify the corresponding moral philosophy for redress as Rawlsian justice (43). Under the moral philosophy of egalitarianism, Crompton and West list equal inputs and equal opportunity. They note that Crompton and Wicks's earlier taxonomy included the category of equal benefits, but consider equal benefits not to be an operational strategy because of the difficulty of measuring benefit (46).

Crompton and West categorize a number of proportional strategies under the moral philosophy of utilitarianism, including efficiency, effectiveness, demonstrated use, demonstrated interest, and advocacy. Although categorized

under utilitarianism, efficiency as described by Crompton and West is administrative efficiency, measured in cost per unit of service output and achieved in the least cost alternative. The authors note that this type of efficiency is influential in the thinking of elected officials because of a political mandate “to be good stewards of tax resources” (47). Effectiveness is a similar concept, but focuses on the impact from benefits for those who receive a service, rather than on measurable service outputs themselves. Demonstrated use and advocacy correspond to Lucy’s concept of demand, while demonstrated interest corresponds to Lucy’s concept of preferences.

Crompton and West further develop upon Lucy’s concept of willingness to pay, offering three examples of strategies that follow the logic of the market, under the moral philosophy of the benefit principle. The benefit principle holds that more benefit should go to those who have contributed more (49). In addition to distribution in proportion to direct price paid, Crompton and West identify proportionality to taxes paid and coproduction. Coproduction refers to contributions that outside individuals make toward supporting public services, such as volunteer staffing at a library or a community fundraising for parks programming.

Taxonomy

Building on the existing scholarship, I propose the following taxonomy of conceptions of equity (Table 1) that can be applied to the provision of accessibility in the pedestrian network.

Table 1. Taxonomy of Conceptions of Equity (Page 1 of 2)

Family	Principle	<i>Operational Criteria</i>
Adequacy	(Adequacy)	<i>What facilities and services define adequacy</i>
		<i>What to do first</i>
Equality	Equal Inputs	<i>Equality by what characteristic of the environment</i>
		<i>What inputs in those environments</i>
	Equal Opportunity	<i>How to define opportunity</i>
		<i>Opportunity for what</i>
	Equal Outputs	<i>Equality by what characteristic of the environment</i>
		<i>What outputs in those environments</i>
	Equal Benefits	<i>Equality by what characteristic of beneficiaries</i>
		<i>What impacts on those beneficiaries</i>
Just Inequality	Principle of Redress (compensatory)	<i>What inequalities to address</i>
		<i>What inputs/outputs/impacts to address them</i>
	Difference Principle (maximize the minimum)	<i>Who is least advantaged</i>
		<i>How to measure benefit for the least advantaged</i>
	Utilitarianism (maximize total utility)	<i>How to approximate utility</i>
		<i>What distribution of benefits will maximize total utility</i>

Table 1. Taxonomy of Conceptions of Equity (Page 2 of 2)

Proportionality	Proportional to Need	What needs What inputs/outputs/impacts to meet those needs
	Proportional to Demonstrated Use	How to measure use What inputs/outputs/impacts
	Proportional to Preferences	How is interest demonstrated What inputs/outputs/impacts
	Proportional to Advocacy	How to measure strength of demands What inputs/outputs/impacts
	Proportional to Contribution	How to measure contribution What inputs/outputs/impacts
Efficiency	Cost Efficiency	Are costs rising or falling Cost of what inputs What outputs/impacts
	Operational Efficiency	What other projects or exiting priorities to combine with

The taxonomy is composed of principles categorized into conceptual families. For each principle, the taxonomy lists specific operational criteria for putting the principle into operation. The operational criteria are essentially questions that must be answered in order to act on the corresponding principle of equity. Depending on how those questions are answered, the actual distribution

can take very different forms. Different though these distributions may be, they would still share a common origin in the same equity principle.

The first family has only one principle: adequacy. Adequacy is placed in its own family because it focuses on the quality of the service itself, rather than on the characteristics of the beneficiaries, locations, or costs. Furthermore, as argued by Lineberry and Welch (1974, 708) and assumed by Lucy (1981, 455), adequacy cannot reliably stand on its own as a guide for equity in public services.

Nevertheless, adequacy is a common standard in public services and deserves inclusion in the taxonomy, if only for its widespread use.

The two operational criteria for adequacy are what facilities and services define adequacy and what to do first. In the case of the pedestrian network, adequacy can be defined by engineering specifications that must be met to ensure a certain level of accessibility. These specifications can include slope and width of path, as well as presence, placement, and dimensions of curb ramps. The technical considerations for accessibility are further discussed in the next chapter. (See pages 64-67.) In situations where there is an existing inadequacy to resolve, the second operational criterion comes into play. Local governments can give highest priority to removing inadequacies that are the most severe and farthest from being adequate, or they can focus on maintaining an adequate level of service for facilities and locations that are the closest to being adequate. In other words, local governments, like people, can confront their weaknesses (the least adequate) or concentrate on improving their strengths (the closest to being adequate).

The second family in the taxonomy is the familiar principle of equality, which I have divided into the principles of equal inputs, equal opportunity, equal outputs, and equal benefits. For the pedestrian network, distributions of measurable inputs and outputs will necessarily be geographic distributions. For this reason, the operational criteria for equal inputs and equal outputs focus on equality by characteristics of the environment, such as the length of the street network or the population of a neighborhood. One version of input equality might say that each hundred-foot stretch of a street should have an equal number of dollars spent to improve the pedestrian facilities along it, while another version of input equality might say that each hundred people of population in a neighborhood should increase the number of dollars spent in that neighborhood by an equal amount. Both versions equalize by an attribute of the environment where the pedestrian improvements are being made.

In contrast, equal opportunity and equal benefits must equalize by an attribute of the pedestrian, since only people can take advantage of opportunities or enjoy benefits. The operational criteria for equal opportunity are how to define opportunity and opportunity for what. How to define opportunity concerns what is to be considered true access to an opportunity. Think of a building with steps up to the main front entrance and a wheelchair-accessible entrance by a loading dock in the back. Do people who do and do not use wheelchairs have an equal opportunity to take part in services offered in the building? Or does the uninviting and stigmatizing back entrance mean that wheelchair users do not have the same opportunity as those on foot? Following Rawls, we can divide the ways to define

opportunity into formal equality of opportunity and fair equality of opportunity. Opportunity for what concerns what is being made available to everyone equally. An accessible pedestrian policy might strive to provide an accessible pedestrian route to each government building to ensure equal access to the public programs offered there, but allow other stretches of the network that connect private facilities to be inaccessible for some. Or instead, the policy might strive to make the pedestrian network itself equally accessible to everyone. Both are implementations of the principle of equal opportunity, but they provide different opportunities.

The operational criteria for equal benefits includes the question of by what characteristics of the beneficiaries will we attempt to equalize the benefits. In theoretical form, equal benefits would equalize the benefits by each individual in all their uniqueness. As an operational principle, however, it would be necessary to classify people and strive at least to make sure that each type of person enjoys equal benefits. There are as many ways to classify people by their characteristics as there are different possible characteristics, so the number of different possible equal benefits strategies is nearly endless. For the accessible pedestrian network, we might expect strategies to focus on providing equal benefits for different types of disabilities or mobility aids, such as pedestrians who use wheelchairs, blind pedestrians, pedestrians who have difficulty or discomfort while walking, and so forth.

The third family in the taxonomy is just inequality, including the principle of redress, the difference principle, and utilitarianism. Different forms of the

principle of redress would differ by the operational criteria of what inequalities to address and what factor to use to address those inequalities. A strategy that invokes the principle of redress might seek to overcome inequalities based on race, gender, wealth, disability, or a combination of all these. Even among strategies that seek to overcome the same source of inequality, they might differ by how they measure the resources that they intend to distribute unequally. A city might dedicate an extra amount of money to sidewalk reconstruction in poorer neighborhoods, using a measure of inputs. Alternatively, the city might make a policy that a greater percentage of completed sidewalk construction projects must be completed in poorer neighborhoods, using a measure of outputs. While the distribution would be similar in either of these two cases, using different measures of resources can lead to different outcomes in the distribution.

Similarly, the difference principle requires operational criteria that determine who is the least advantaged and decide how to measure the benefit to this group. The least advantaged could be identified by any manner of inequality, including all those mentioned above. While the principle of redress can consider inputs, outputs, or any other measure of preference for the disadvantaged, the difference principle must consider the ultimate benefit to the least advantaged. Like the principle of equal benefits, strategies following the difference principle must define and use some way of measuring benefit.

Utilitarianism seeks to maximize utility, but as an operational strategy utilitarianism must define and follow a particular approximation of utility. One type of utilitarianism might focus on maximizing happiness, but then would have

to provide a way of accurately measuring each individual's happiness. Another type of utilitarianism might focus on aggregate wealth, which could be approximated using the techniques that economists use to estimate gross domestic product. Utilitarianism also then requires a second operational criterion of what distribution will maximize total utility. When setting policy, it is not enough to describe the end goal, which in this case is achieving maximum aggregate utility. Policy must also identify what direction to move in to achieve that goal. For this reason, a strategy of utilitarianism must make an a priori assumption about which distribution will be the best and therefore should be the objective of the policy.

The fourth family in the taxonomy groups principles of proportionality. Following Lucy (1981) and Crompton and West (2008), the relevant principles are based on proportionality to need, demonstrated use, preferences, advocacy, and contribution. Proportionality to need requires an operational criterion to decide what needs to address. For the pedestrian network, possible needs include the potential for total pedestrian traffic, the needs of people with disabilities for accessible routes, pedestrians' general need for safety, or the need for more of the regular physical activity that routine walking can provide.

Proportionality to demonstrated use requires an operational criterion to decide how to measure use. For the pedestrian network, use could be total pedestrian traffic along a particular route, or use could look more closely at a particular piece of infrastructure, such as a curb ramp, and observe the use of the facility by pedestrians who specifically benefit from it, such as pedestrians in wheelchairs who need the curb ramp to access that sidewalk. Similarly,

proportionality to preferences and to advocacy must define ways to measure the strength of the preferences and strength of the advocacy. Preferences could be measured with surveys, focus groups, or other methods for soliciting public input. Advocacy could be measured either technically such as by the number of complaints or requests, or organically, such as by simply following the political pressure wherever it leads.

The principle of proportionality to contribution also requires an operational criterion to decide how to measure contribution. For public services that are difficult to charge for directly, contribution can be measured as either taxes paid or coproduction.

The final family in the taxonomy is efficiency, comprising cost efficiency and operational efficiency. Here efficiency does not refer to the principle of maximizing aggregate results, as in utilitarianism or Lichfield's efficiency criterion, but rather to the principle of administrative efficiency, described by Lineberry and Welch as "getting the most output from the least amount of input" (Lineberry and Welch 1974, 710). Like adequacy, administrative efficiency is not truly a principle of equity. However, it deserves inclusion in the taxonomy because it so widely used as a guide for distributions of public services.

Here the distinction between cost efficiency and operational efficiency is simply whether the focus is on cost as the primary determining factor. Unique among principles in this taxonomy, cost efficiency has three operational criteria. Two of the criteria, the question of what inputs to measure the cost of and the question of what outputs or impacts, are self-evident. In order to calculate what

strategy gets the most output for the least input, one must define how to measure inputs and outputs. The other criterion adds the element of time, asking if costs are rising or falling. If costs are falling over time, the principle of cost efficiency would demand that the least costly improvements be made first, since other improvements will be net less expensive if made later. This is the most common situation, since advancing technology and a growing economy have tended to increase the amount of resources available over time. Like money earning interest in the bank, a dollar not spent today will have buying power of greater than a dollar in the future. In economic terms, assuming that costs are falling means assuming a positive sign for the time value of money.

In the context of local governments, however, there can be situations where it is more realistic to assume that costs are rising over time. When costs are expected to rise and the time value of money is assumed to have a negative sign, the principle of cost efficiency would demand that the most costly of committed improvements be made first. There are at least two reasons why this is likely to happen for local governments. The first reason is that the cost to local governments for providing services has increased much more rapidly than the governments' revenue (Fisher 2010). On the revenue side, aid from federal and state governments to local governments has decreased over the past four decades since the early 1970s. Meanwhile, property tax caps and other legislation restricting municipalities' power to raise funds have also tightened. On the cost side, government is a labor-intensive industry that has benefited little from efficiency advances in technology while a rising standard of living has increased

labor costs for both directly employed staff and construction contracts. A second reason why costs may rise over time for local governments is that the amount of funds available can be very dependent on political will. If a sense of crisis or popular pressure brings together the political will to tackle some issue, be it pedestrian accessibility or administrative reform, it can be crucial to strike while the iron is hot and take on the most difficult tasks first. Highly visible success that has noticeable impacts early on may be the only way to secure funding into the future.

While cost is the determining factor for cost efficiency, the potential gains from combining with other projects and programs is the determining factor for operational efficiency. The one operational criterion for operational efficiency is therefore what other projects or existing priorities to combine with. Other projects may already have established organizational structures, procedures, or funding sources that a new priority can utilize. Combining projects may also provide direct cost savings itself, by removing the need to duplicate time, resources, and personnel.

Each of the principles and possible strategies in this taxonomy reflects a particular conception of equity and grows out of a unique context of theory and practice. Local government officials are not merely picking from conceptions of equity in the taxonomy like picking items on a menu. Rather, their own background of ideological influences and experience, including their own past practices, guide them to conceive of the issue in particular ways. Whether a city chooses to prioritize pedestrian accessibility in proportion to need or to provide

equal inputs, for example, is largely based on how the officials in that city have been led to define and think about accessibility in the pedestrian network.

The Context for Prioritizing Accessibility in the Pedestrian Network

Sidewalks and other pedestrian rights-of-way are constructed within a physical context of buildings and streets in the city. They are also constructed within a complicated social context of ideas and histories, from the progress of the disability rights movement to the practices of public works engineering. Each piece of the context comes ready with its own particular view of equity, and so contributes to how local officials think about equity when planning to make the pedestrian network accessible for people with disabilities.

This chapter introduces three large ideas that contribute to the context for pedestrian accessibility. The first is how we think about disability. Disability laws and social movements in the past half century have profoundly affected what people, including local officials, see as the reasons to provide social amenities, like sidewalks, that meet the needs of people with disabilities. The second idea is how we think about the sidewalk itself. Depending on what the purpose of the pedestrian network is, there can be very different notions regarding how to prioritize improving its ability to achieve that purpose. The meaning of disability concerns the users of the pedestrian network, while the meaning of the sidewalk concerns the physical infrastructure that they use. The third big idea, the meaning of accessibility, concerns the interaction between the users and the physical infrastructure. There are many possible specific locations, facilities, and construction projects that can provide accessibility. How we think about

accessibility guides us toward one particular set of improvements over another set of improvements.

The Meaning of Disability

The strongest force for improving accessibility in cities throughout the United States today is the legal obligation of the Americans with Disabilities Act (ADA). Because of the enforcing strength of the ADA, these efforts are necessarily focused on accessibility for people with disabilities, rather than general ideas about improving access for more broadly defined “pedestrians.” Improving the sidewalk becomes not just a public works issue or a transportation issue, but a disability issue. The way that officials think about disability affects how they think about prioritizing accessibility.

Disability is related to a condition of a person’s body, but it is not the condition itself. We are very diverse in the functional abilities of our bodies. Our bodies can have some kind of impairment that limits our functional ability, whether an impairment to mobility, such as missing limbs or being unable to walk, or an impairment to sensory perception, such as being blind or deaf, or an impairment to mental functioning. Each of these impairments can be medically identified and defined. Impairment often, but not necessarily, leads to disability. While impairment is a physical condition of the body, disability is a social condition that is caused by the interaction of the physical impairment with the expectations of society (Hahn 1986, 274). An impairment only becomes a disability if it limits a person’s ability to perform “socially accepted or prescribed tasks” (Berkowitz and Hill 1986, 4). Disability only makes sense within the

context of a particular set of socially prescribed tasks. Disability is socially defined.

Given that disability is a social phenomenon, there are several different ways that modern society has defined disability. One tradition of policy toward people with disabilities follows the economic model. In the economic model, disability is an inability to be economically productive (Stone 1984; Hahn 2003, 28). A worker who becomes disabled through no fault of his own deserves assistance to make up for lost income. This model is behind a range of twentieth century programs for people with disabilities. State workers' compensation programs, started in Wisconsin and New Jersey in 1911, provide cash payments to workers disabled through some fault of their employer (Berkowitz 1987, 15). At the national level, the Social Security Disability Insurance (SSDI) program, established by Congress in 1956, provides income for people who leave the workforce before retirement age due to a medically identified impairment (Berkowitz 1987, 41; Stone 1984, 86-89). A different approach within the economic model are vocational rehabilitation programs, which began in the 1920s. While workers' compensation and SSDI try to make up for lost income through cash payments, vocational rehabilitation tries to rehabilitate the person to being able to be economically productive again (Berkowitz 1987, 155). Despite their differences, and the conflicts over national policy that they have generated, all three of these programs rely on the economic model of disability.

The economic model of disability suggests a conception of equity based on the principle of proportionality to need. Impairment is undeserved, but causes

someone to be unable to meet their economic needs through work. They are deserving of special treatment to meet their needs. The extent of the special treatment is conditioned on the ability of the rest of society to support their needs, and the willingness of the rest of the society to give them special treatment.

An alternate tradition of policy toward people with disabilities is based on a sociopolitical model of disability. In the sociopolitical model, disability is caused by a disabling environment, which itself is created by social prejudice against people who do not conform to physical and functional expectations (Hahn 1986, 274; Berkowitz 1987, 8; Light 2001, 271; Schriner and Scotch 2003). One clear statement of the sociopolitical model comes from the Union of the Physically Impaired Against Segregation, an activist group in the United Kingdom, which defines disability as “the disadvantage or restriction of activity caused by a contemporary social organization which takes little or no account of people who have physical impairments and thus excludes them from participation in the mainstream of social activities. Physical disability is therefore a particular form of social oppression” (quoted in Oliver 1996, 22). The existing built environment, rather than passively serving as a neutral background to the activities of all people, actually confers advantages on those of us without disabilities at the same time that it confers disadvantages on those of us with disabilities (Hahn 2003, 37).

In the sociopolitical model, dealing with disability is not an issue of economics but an issue of rights. Just as people of all races have equal claim to the same rights and liberties as citizens, so too do people with disabilities have the

same rights to live in the world as anyone else. Jacobus tenBroek, a blind lawyer and leader of the National Federation of the Blind for two decades, made an early statement of the principle of equal rights in a 1966 law review article titled “The Right to Live in the World” (tenBroek 1966). Understanding disability as the effect of unequal rights establishes a moral and legal imperative to fundamentally restructure the disabling physical and social environment. Under the economic model, although society owes some assistance to a person with disabilities in regaining economic productivity or meeting needs, it is still the person herself that needs to change. In contrast, the sociopolitical model of disability contends that it is the disabling environment that has to change (Schriner and Scotch 2003).

The sociopolitical model of the disability suggests a conception of equity based on the principle of equality. People with disabilities deserve equal rights, equal benefits from the built environment, and equal opportunity to advantages provided by the built environment. In contrast to the economic model, for which balancing costs and benefits is critical, the principle of equal rights in the sociopolitical model means that equal environmental accommodations must be provided, without regard to the relative cost (Hahn 2003, 47).

The sociopolitical model came into ascendance as people with disabilities began to organize and speak for themselves. In the United States, this came in the 1960s and 1970s, around the same time as the civil rights movement by African-Americans. Some of this timing was an unrelated coincidence. Many of the leaders of the early disability rights movement had been polio survivors who were able to attend college in the great expansion of college education after World

War II (Berkowitz 1987, 201). Their movement was invigorated by the visibility and activism of Vietnam War veterans who lost limbs in the war (Scotch 2001, 7). Both of these elements were largely unrelated to the Black civil rights movement. However, some of the timing was also related, as the disability rights movement took inspiration and techniques from the civil rights movements of racial minorities (Burgdorf 1991, 426-428).

The sociopolitical model thus is part of what many identify as a minority group model of disability (Hahn 1986, 274; Berkowitz 1987, 187). Because disability is caused by social prejudice, and by the disabling environment created by the prejudice, people with disabilities are a social group that has been discriminated against, just like African-Americans and other minorities. This suggests two principles of equity in addition to the principles of equal opportunity and equal benefits. First, past discrimination calls for redress. It is not merely individual people with disabilities who deserve equal rights, but the whole class of people with disabilities, collectively, who deserve now the redress for all past discrimination. Under the principle of redress, people with disabilities should be given disproportionately more resources and benefits when prioritizing improvements. Second, to the extent that minority groups can function as political interest groups, political advocacy can be a powerful tool to further their interests. Therefore, as a practical tactic, the minority group model of disability suggests the principle of proportionality to advocacy.

The drafting of the Rehabilitation Act of 1973 offers an illustrative example of how disability policy was made by analogy to other civil rights

movements. The origin of the law was, as the name suggests, a renewal of programs for vocational rehabilitation. As we have seen, vocational rehabilitation comes out of the economic model of disability. However, one section of the act stands out as clearly drawing on a different model. Section 504 prohibits discrimination against people with disabilities in any federal service or program, including any program that is fully or partially federally funded. Non-discrimination includes making physical, architectural modifications to facilities to ensure that they are accessible to people with disabilities (Jones 2011, 2265). Section 504 was the first strong statement for the sociopolitical model of disability in U.S. law.

The language in section 504 is nearly identical to anti-discrimination language in the 1964 Civil Rights Act. Scotch (2001, 51-52) relates that when congressional staffers were working out language for the Rehabilitation Act in late August 1972, they wanted legal language to make sure that rehabilitated people would not be turned away by prejudiced employers. Some of the staffers had worked on earlier civil rights legislation, and so turned to the language in the Civil Rights Act. The anti-discrimination language was included in the Rehabilitation Act passed by Congress the next year, apparently not drawing any particular attention from members of Congress reviewing the bill (Scotch 2001, 53). This episode shows that policy-makers are heavily influenced by the ways of thinking that they are most familiar with. Just as congressional staffers recast disability in the frame of civil rights because of past experience working with civil rights legislation, so too will local officials making decisions about

pedestrian accessibility turn to their familiar frames and past experience for guidance.

The Rehabilitation Act of 1973 also introduced the idea of reasonable accommodation. The act provides that entities covered by the act, including private employers and federally funded government programs, must make “reasonable accommodations” for people with disabilities. Thus the requirement for accommodation is tempered. Employers and service-providers are not required to make accommodations that are unreasonable (Collignon 1986, 200-203). For the creators of the Rehabilitation Act, reasonable accommodation offered a middle ground between an unacceptable present situation and a possibly unattainable future ideal (Light 2001, 266). For our purposes, the standard of reasonable accommodation represents a reinvocation of the principle of proportionality to need over the principle of equal rights. With reasonable accommodation, the needs of people with disabilities must be balanced against the economic costs of providing accommodations, that is, balanced against the needs of entities providing the accommodation.

The various strains of disability policy and the disability rights movement came together in 1991 with the enactment of the ADA. Throughout the 1980s, advocates had pressed for formal recognition of the civil rights of people with disabilities (Jones 2011, 2268). This movement combined with a trend toward conservative economics that wanted to move people out of the welfare system of disability benefits (Russell 1998; Light 2001, 272). This ideological alliance

ensured that the act passed with large bipartisan majorities in both houses of Congress and was signed into law by Republican president George H.W. Bush.

As a result of the political alliance that created the ADA, the act shows a mixture of influences from the economic, sociopolitical, and minority models of disability. The definition of disability in the ADA incorporates the understanding of disability as a socially constructed concept, though related to physical impairment. The act divides its definition of disability into three prongs: (A) an “impairment that substantially limits a major life activity,” or (B) “a record of such an impairment,” or (C) “being regarded as having such an impairment” (ADA §3(2); codified since amendments in 2008 at 42 U.S.C. §12102(1)). The influence of the sociopolitical model is particularly evident in the second and third prongs. These specifically relate to society’s perception of the impact of the impairment rather than any limitation necessarily due to the impairment itself. Together, these prongs reinforce that disability is created through social perception, and prejudice, not merely through an individual’s loss of economic productivity.

The findings that introduce the ADA show the influence of both economic and equality considerations. Among the economic considerations, the act asserts that discrimination against people with disabilities “costs the United States billions of dollars in unnecessary expenses resulting from dependency and nonproductivity” (ADA §2(a)(9); 42 U.S.C. §12101(a)(8)). While making a strong case against discrimination, as emphasized by the sociopolitical model, this finding also implicitly sets up a comparison where the cost of accommodations

must be balanced against the costs of dependency and nonproductivity. The act's concessions to economic balancing rather than firm rights continue in the main provisions of the law, which require employers to make only "reasonable" accommodations for employees with disabilities, and only so long as the accommodation would not impose "an undue hardship on the operation of the business" (ADA §102(b)(5)(A); 42 U.S.C. §12112(b)(5)(A); Imrie 1996, 65).

Among the equality considerations in the ADA's findings, the act also asserts that "the Nation's proper goals regarding individuals with disabilities are to assure *equality of opportunity, full participation*, independent living, and economic self-sufficiency" (ADA §2(a)(8); 42 U.S.C. §12101(a)(7); emphasis added). By using such language, the ADA appears to codify tenBroek's (1966) "right to live in the world."

The ADA consists of five main parts. The first part, Title I, prohibits discrimination in employment. The second part, Subtitle A of Title II, concerns activities of state and local governments. The third part, Subtitle B of Title II, covers public transit in more detail than other local government activities. The fourth part, Title III, covers places of public accommodation, including private spaces such as stores, restaurants, theaters. The fifth part, Title IV, covers telecommunications. (There is also a Title V which contains miscellaneous provisions.)

As an activity of local governments, the pedestrian network is covered in Subtitle A of Title II. The subtitle applies to all public entities, including city and county governments, and requires that all "programs, services, and activities" be

accessible. Specifically, “no qualified individual with a disability shall, by reason of such disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity” (ADA §202; 42 U.S.C. §12132). Regulations issued by the Department of Justice for Subtitle A of Title II state that each facility does not necessarily have to be accessible, as long as the service “when viewed in its entirety, is readily accessible to and usable by individuals with disabilities” (28 C.F.R. §35.150(a)(1)). This suggests a loose formation of the principle of equal opportunity, since it is enough for people with disabilities to take some part in the service, even if they do not have full access to each and every facility that other people have.

There is one provision where ADA regulations go beyond suggesting principles of equity to actually mandating a particular prioritization strategy for accessibility in pedestrian rights-of-way. Public entities must have a transition plan that sets out how they will make structural improvements over time to ensure access to existing facilities (28 C.F.R. §35.150(d)). For any public entity with jurisdiction over the pedestrian network, the transition plan must contain a schedule for providing curb ramps throughout the network. The regulations go on to specify that this schedule must give “priority to walkways serving entities covered by the Act, including State and local government offices and facilities, transportation, places of public accommodation, and employers, followed by walkways serving other areas” (28 C.F.R. §35.150(d)(2)). Guidance from the Department of Justice makes clear that this is an ordered list: local government facilities have the highest priority, followed by bus stops and other transportation

facilities, down through public accommodations, and business districts. Curb cuts in residential areas are to be given the least priority (DOJ 2007, chap. 6, p. 12). This ranking primarily reflects formal equality of opportunity to access government services. Although access to employers would not normally be considered a government service, in the context of the ADA it is the government regulation that ensures that the employers are accessible. In this sense, access to business districts can be considered a government service. The ranking among ADA-covered locations, with government facilities at the top and business districts at the bottom, does not have a basis within the act itself, but may reflect a sense of decreasing government involvement.

The legal history of the ADA since it was enacted also suggests particular ways of dealing with the question of equity in pedestrian accessibility. One legal question has been whether the pedestrian network itself is a “program, service, or activity” of local governments and thus covered by Title II of the ADA. If sidewalks are a program, service, or activity, then the legal result is that all sidewalks must be made accessible. Instead, if sidewalks are facilities that provide access to programs, services, or activities but are not themselves services, then the legal result is that a sidewalk only has to be accessible when it is necessary to access an actual service of a public entity. The legal question seems to have been settled, as U.S. Courts of Appeals for both the Ninth Circuit in *Barden v. Sacramento* (2002) and the Fifth Circuit in *Frame v. Arlington* (2011) have ruled that providing and maintaining sidewalks is a program, service, or activity and therefore the pedestrian network itself is covered by ADA. In both cases, the U.S.

Supreme Court declined requests to review the appeals courts' decisions (Jones 2011, 2283), effectively upholding the determinations of the lower courts.

A related question of distributional justice does remain, however. That is, what is the proper object to equality of opportunity when applying it to pedestrian accessibility? Equality of opportunity to use the pedestrian network, or equality of opportunity to access government services and other specific destinations? The successful plaintiffs in *Barden* and *Frame* would likely argue that all people must have an equal opportunity to use the pedestrian network itself. On the other hand, many cities' prioritization strategies, and the justice department's own guidance as mentioned above, seem to argue that accessibility in the pedestrian network is just one of various means for achieving equality of opportunity to access government services. Although both sides of the question invoke the principle of equal opportunity, they can lead to noticeably different prioritization strategies.

The history of ADA litigation also shows the effect of advocacy. Several landmark court decisions and settlements have made headlines for the dollar amounts involved and for the great shifts in local policy that the settlements made. In the settlement resolving the *Barden* case, the City of Sacramento agreed to spend twenty percent of its transportation budget for up to thirty years from 2004 on installing curb ramps and removing barriers to access in pedestrian rights-of-way. Not only is this a major commitment of funds, the settlement expressly gives highest priority to improvements that are requested by members of the class in the suit, that is, people with mobility or vision disabilities (Disability Rights Advocates 2004, 15). Local accessibility advocates in Chicago, dissatisfied with

the city repeatedly installing inaccessible curb ramps and sidewalks for more than a decade after the ADA took effect, filed suit against the city in 2005. The City of Chicago settled with the plaintiffs in 2007 by pledging to spend \$10 million each year for five years to replace inaccessible curb ramps and sidewalks in specific high-traffic areas, while continuing to separately devote \$18 million yearly to accessibility improvements as part of its regular street resurfacing work (Woerthwein 2007). In the largest legal settlement for pedestrian accessibility to date, Caltrans, the state transportation department for California, agreed in 2010 to spend \$1.1 billion over 30 years bringing accessibility to existing sidewalks on state highways and to Park and Ride facilities, including yearly commitments that start at \$25 million a year and rise incrementally to \$45 million a year (Disability Rights Advocates 2010). The settlement also established procedures for making requests, which Caltrans must consider when prioritizing how to spend its committed funds.

Often the dollar amounts and penalties of a lawsuit have less of an impact on policy than the advocacy itself which brought the suit. An official at the City of Boston, citing more than \$300,000 in fines issued by the state access board against the city in 2007 for constructing inaccessible sidewalks, explained that fines were relatively small compared to the cost of making accessibility improvements. Yet, the case became an “aha moment” for the City of Boston, contributing to a shift throughout the city government toward officials recognizing the importance of access and being much more proactive about

meeting the needs of people with disabilities.* While these fines were issued under a state law rather than the ADA itself, the episode shows that local disability laws, like the ADA, in practice can support equity based on proportionality to advocacy.

These cases have strengthened the power and expanded the scope of the ADA and similar laws. There have also been court cases that have restricted the reach of the ADA. Diller (2003), based on a review of the judicial history of employment cases under ADA Title I, identifies a judicial backlash against the act. Courts have rejected the rights frame of the ADA, preferring to see it instead as a public benefits law. This returns to the economic model of disability, and the principle that disability policy is not a right but a special treatment for a deserving class of people. Rejecting the ADA as a civil rights law is rooted in a general backlash against policies like affirmative action that use conceptions of equity based on equal rights to justify unequal treatment. The backlash against the civil rights frame of the ADA is also driven by a rejection of the minority model of disability and its analogy to the experience of racial or ethnic minorities. Some of the same arguments are echoed in cities' defenses against ADA Title II claims. The National League of Cities, in a brief supporting the City of Sacramento's position in *Barden*, argued that mandating access on all sidewalks would limit funding available to other accessible programs (Jones 2011, 2287). Implicit in this argument is that access is not a right which must be provided equally to

* Interview with Kristen McCosh, City of Boston Commissioner for Persons with Disabilities, Tuesday 20 December 2011.

everyone, but a special benefit which must be balanced against the cost of providing the benefit.

The prevailing definition of disability has shifted throughout the past century, from medical definitions to the economic and sociopolitical models. Each view of disability suggests a different way of achieving equity in accessible streets. Yet, the ideas of the past never go away. Instead, they remain in the background context that policy draws from, continuing to offer alternative conceptions of equity.

The Purpose of the Sidewalk

The meaning of disability is not the only factor affecting accessibility that can lead to different conceptions of equity. The meaning of the sidewalk also suggests different possible equity principles. Pedestrian rights-of-way are simultaneously transportation infrastructure, public space, and amenities that can increase public health and wellbeing.

Several traditions look at the sidewalk as a public social space of interaction. Blomley (2011) groups these traditions under the label of civic humanism. They are humanist because their focus is on the human being that uses the sidewalk. In these traditions, to traverse the sidewalk is to participate in society. Accessibility for people with disabilities is thus essential to recognizing their humanity and membership in society.

Public space theory, one of the traditions of civic humanism in pedestrian right-of-way, sees the sidewalk as a public space that contributes to what Jürgen Habermas (1989) calls the “public sphere.” The public sphere is political life and

citizenship distinct from the state, the economy, and private life. The public sphere is fragile, and can only be maintained by informed, open conversations. This dialogue requires open, inclusive public space. Only by encountering and interacting with the diverse members of society can we build the mutual respect that holds us together in a society of shared citizenship. The sidewalk ballet described by Jane Jacobs (1961) is an example of the sidewalk used as a public space, sustaining the life of urban neighborhoods. For the sidewalk to foster public engagement, it must be complex and full of interruptions, from the man delivering boxes for a local shop to the friend who stops you for a chat. The use of the sidewalk as a political space is also visible in urban protests that fill or block streets, including actions of the Occupy Movement in 2011 and 2012. Likewise anti-abortion activists who seek to dominate the space outside clinics where abortions are performed are also expressions of the sidewalk as political space (Blomley 2011, 20).

In another strain of civic humanism, urban designers have emphasized the power of social interaction in the pedestrian space to make places agreeable and enjoyable. Notable proponents include William H. Whyte (1980; 1988), Donald Appleyard (1981), and more recently Jan Gehl (2010). For these theorists, the value of the sidewalk as civic space is primarily in the enjoyment that it provides, thereby increasing the wellbeing of the people enjoying it. For Whyte in particular, congestion on the sidewalk enhances rather than decreases the functionality of the sidewalk. Congestion is an expression of people's attraction to other people and activity, of their desire to see and be seen. All of this is

enjoyable, so congestion on the sidewalk increases the pleasure and satisfaction that people can draw from the sidewalk.

A third strain of civic humanism is part of the theoretical turn in geography toward the study of flows. It is not the physical characteristics of the sidewalk that define it, but rather the human actions that take place on it. Sites of walking are “produced and constituted through the act of walking” (Blomley 2011, 24). Walking is a form of expression and creation, much like the act of speech. I note here that the act of walking includes someone traveling in a manual or motorized wheelchair. Just as using sign language is a form of speech that has more in common with vocal speech than with writing or other forms of expression, so using a wheelchair has more in common with walking on foot than with bicycling, driving, or other forms of transportation. In this third tradition of civic humanism, collision is not obstruction but social interaction. This social interaction is the genesis of creating new social and material realities.

The several strains of the civic humanist tradition all hold that the act of walking is not merely functional but also social and emotional. While the civic humanist approach to pedestrian rights-of-way highlights barriers to flow as part of the function of the sidewalk, it is important to stress that these are barriers created by congestion and social interaction, not by ramps that are too steep or uneven surfaces that cause people to trip. In these traditions, a good sidewalk is diverse and complex while also inclusive and tolerant. A basic level of accessibility, even if it comes with complexity and barriers to flow, is essential for a sidewalk to be inclusive. All of these traditions suggest that to exclude people

with disabilities from the use of the sidewalk is to exclude them from full participation in society. It is less important where the sidewalk is leading or how it helps connect particular destinations with each other and more important what happens on the sidewalk between here and there. This suggests the principle of fair equality of opportunity, encompassing opportunity to use the pedestrian network itself as well as opportunity to participate in society.

In contrast to these traditions of civic humanism, many local governments view the sidewalk as physical resource designed to facilitate pedestrian flow and circulation. Blomley (2011) calls this tradition “pedestrianism” and argues that it has gone unnoticed by theorists despite its power and pervasiveness. While the civic humanist perspectives focus on the people who use the sidewalk, pedestrianism focuses on the physical space itself and its capacity to facilitate or impede flow. For pedestrianism, walking is a functional activity used by a person to get from a point of origin to a destination. All obstacles in the pedestrian path, whether they be utility poles, newspaper boxes, missing paving slabs, unramped curbs, or stationary people, all impede the flow of pedestrian traffic and therefore are all treated equally as encroachments into the pedestrian space. Where civic humanists find many possible purposes of the sidewalk, from political expression to pleasure, the view of pedestrianism is simple. In the words of one city’s civil engineer, “the purpose of the sidewalk is to allocate [transportation] space for pedestrians” (Blomley 2011, 35).

The goals of pedestrianism are achieved through design standards and engineering specifications. For this reason, the perspective of pedestrianism

suggests the principle of adequacy. A sidewalk is adequate when it has a continuous clear path wide enough to comfortably accommodate the expected number of pedestrians, for example. Instead of invoking other possible equity principles to find some balance between the different uses and users of the sidewalk, pedestrianism focuses instead on the single variable of pedestrian flow. In that focus, pedestrianism seeks to ensure a minimum level of adequate flow. From the great number of inaccessible sidewalks in cities throughout the country, it is clear that design standards have historically often ignored the needs of pedestrians with disabilities. Nonetheless, the tradition of pedestrianism can be easily modified by incorporating design standards for accessibility. Although this changes the outcome of what types of infrastructure is provided in the pedestrian right-of-way, incorporating accessibility for people with disabilities does not fundamentally alter the perspective of pedestrianism or its relation to the principle of adequacy.

A different view on the meaning of the sidewalk, although one closely related to pedestrianism, is the concept of complete streets (McCann and Rynne 2010; National Complete Streets Coalition 2013). The idea behind complete streets is that too often roadways have been designed for cars only. When streets are designed exclusively or primarily for cars, any facilities for pedestrians or bicycles come as something of an afterthought. Instead, the concept of complete streets is a way to advocate for streets to be designed for all users, including people walking, people bicycling, people sitting or standing and talking, people enjoying the shade of street trees, and of course people in cars. Not only is a

complete street designed for all modes of movement (and non-movement), but it is also designed for all types of users including people with disabilities.

Bromley argues that the concept of complete streets has developed out of pedestrianism (Blomley 2011, 52). He notes that for advocates of complete streets, cars are merely an encroachment that impede the pedestrian flow, just like other types of encroachments identified by pedestrianism. In truth, the concept of complete streets acknowledges the many other uses of the sidewalks that have nothing to do with flow, including stationary socializing. However, it does seek to achieve those goals without compromising the flow of pedestrians, bicycles, and cars. Thus, complete streets does share with pedestrianism a natural bent toward the principle of adequacy as set by design guidelines and standards. Furthermore, the frame of restoring equity among users of the sidewalk suggests some kind of equal benefits approach, where each mode of travel and each type of user is able to get equal benefits from the facilities provided in the complete street.

There are other more specific benefits that people expect the sidewalk to provide. Litman (2013) offers an extensive catalog of observed and theoretical benefits from the pedestrian network, from the economic effect of increased property values (22) to the emotional effect of independent mobility for children, the elderly, and others who cannot drive (27). The three main categories of benefits that have attracted the most attention are the potential positive effects on public health, traffic safety, and the environment.

In the realm of public health, walkability advocates point to the role of pedestrian infrastructure to encourage walking as routine daily exercise (see e.g.

Younger and others 2008; Hutch and others 2011). Facilities for pedestrians are seen as an important tool in combating the growing problem of obesity. Federal guidelines recommend that all adults, including elderly adults and people with disabilities, be physically active for at least 150 minutes a week (HHS 2008, 22, 30, and 43). This level of activity is easily achieved, and often most conveniently achieved, by daily walking. Living in a neighborhood with infrastructure and attractive destinations for walking makes it easier to achieve the recommended guidelines and enjoy the health benefits. Studies have demonstrated that residents of walkable neighborhoods exercise more and are less likely to be overweight than residents of other areas (Litman 2013, 25).

Sidewalks and other pedestrian infrastructure not only make walking more attractive for physical exercise, they can also make walking safer. Without curb ramps, for example, many pedestrians who use wheelchairs ride them in the streets, mingling with cars and exposing themselves to being hit, often fatally (Jones 2011, 2261). One of the major factors that contributes to making streets dangerous for pedestrians is simply not having sidewalks, crosswalks, and other facilities of basic pedestrian infrastructure. People trying to cross the road are most in danger of being struck and killed where there is no crosswalk. According to an analysis by the advocacy organization Transportation for America using data for the Fatality Analysis Reporting System of the National Highway Traffic Safety Administration, more than 40% of pedestrian traffic deaths in the United States from 2000 to 2009 occurred in locations with no available crosswalk (Ernst 2011, 27 and 33).

Children are also particularly vulnerable both because they walk more and are less visible to drivers. The Safe Routes to Schools movement is one attempt to protect children from traffic accidents. The movement originally started in the city of Odense, Denmark in the 1970s in response to concerns about students being hit by cars. The first Safe Routes to School programs in the United States started in 1997, but the movement gained wide notice in this country after it was included as a funding program in SAFETEA-LU, the 2005 federal transportation law (Stewart 2011; PBIC 2012, 1-2 and 1-14). While keeping the original intent of pedestrian safety for children, Safe Routes to Schools programs and funding have expanded to combat obesity as well as provide walking and bicycling facilities for people of all ages (Boarnet and others 2007).

A third benefit from walking comes not from the activity of walking itself, but from the activity it usually displaces: driving. While driving a car uses fossil fuels and creates emissions that contribute to air pollution and global warming, walking creates no emissions and requires only food as fuel. To the extent that improvements to pedestrian rights-of-way make more people willing and able to walk, pedestrian infrastructure saves energy consumption and reduces air pollution. Increased walking can provide a surprisingly large environmental benefit, since walking usually displaces short car trips which have the highest fuel consumption and emissions per mile. Each one percent shift in the number of trips from automobile to walking and other non-motorized transportation is estimated to reduce fuel consumption by two to four percent (Litman 2013, 36).

Improvements to sidewalks are some of the most effective actions that local governments can take to reduce air pollution and slow global warming.

Each of these three specific benefits of pedestrian rights-of-way—for health, safety, and the environment—suggests prioritization based on the principle of proportionality. Considering the public health benefits would suggest that improvements for pedestrian accessibility be prioritized in locations that have the highest rates of obesity and lowest rates of physical activity. Concern for pedestrian safety would suggest priority in proportion to how safe current conditions are, with the highest priority going to the most dangerous places or locations with the highest report rate of traffic accidents involving pedestrians. Environmental considerations suggest priority in proportion to either the existing level of air pollution or to the potential for pedestrian infrastructure to successfully replace car trips, or both.

The health, safety, and environmental reasons for the sidewalk do not emphasize accessibility for people with disabilities. However, to the extent that local governments recognize that people with disabilities need exercise, should not be hit by cars, and do drive, then pedestrian infrastructure that promotes these causes should also be made accessible. The fact that accessibility shares goals with other causes can be an advantage. In addition to the principle of proportionality, these causes also suggest the principle of operational efficiency, since improvements for accessibility can be funded through transportation funding programs that were designed for provide safe routes to schools or improve air quality.

The Definition of Accessibility

The concept of accessibility is easy to understand in generalities. A place or activity is accessible if people can get to the place and partake in the activity. Specifics, however, necessarily require that accessibility be defined by technical standards that can be engineered and evaluated. Once made specific, small assumptions and difference can matter a great deal. For example, the sidewalks constructed throughout most of the nineteen and twentieth centuries were designed to be accessible, but only with certain able-bodied people in mind. Harlan Hahn quotes an urban planner in Los Angeles who asserts that the built environment is designed for “the average human being, plus or minus half a standard deviation” (Hahn 1986, 273). Although the results are designed for a certain kind of accessibility, in effect this practice has produced a built environment that is inaccessible and disabling for a large number of humans, possibly even a majority.

One approach to inaccessible standards is to improve the standards by taking into account the real abilities of all users. Technical studies are useful to acknowledge and elucidate the particular functional abilities of people with disabilities, thereby contributing to improving accessibility. Studies have investigated diverse topics from how steep of a slope can be successfully navigated by individuals using wheelchairs (Vrendenburgh and others 2009) to what color contrasts make sidewalk markings most detectable to people with vision impairments (Jenness and Singer 2006). The results of various studies are collected and synthesized in guideline reports. Such guidelines are designed to

serve as practical manuals for engineers and builders working on specific accessibility projects. Some guidelines focus on specific situations or technologies, such as accessible pedestrian signals at road crossings (Harkey and others 2009), while others address the full range of improvements for pedestrian accessibility (McMillen and others 2001; PROWAAC 2007). Because of the federal government's major role in transportation policy and funding in the United States, including the funding of pedestrian projects, many of the guidelines for pedestrian accessibility are funded or produced by the Federal Highway Administration.

Technical studies and guideline reports have a very important role in the development of accessible streets because they become the basis for legally enforceable standards. Under the ADA, the Architectural and Transportation Barriers Compliance Board, an independent federal agency known simply as the "Access Board," is charged with developing accessibility guidelines for facilities covered by the act. To develop its guidelines, the Access Board relies on technical studies; research funded directly by the board and by other federal agencies; advisory committees; and public comments on its proposals. The guidelines adopted by the Access Board are in turn codified as legally enforceable standards by the U.S. Department of Justice and the U.S. Department of Transportation. The current version of the Access Board's ADA Accessibility Guidelines (ADAAG) were adopted in 2004 and became the basis for standards issued by the Department of Transportation in 2006 and the Department of Justice in 2010 (Access Board 2013). Although many aspects of the ADAAG apply to pedestrian rights-of-way, such as the guidelines for the width of accessible routes or the

slope of ramps, these guidelines are written for buildings and facilities rather than for public rights-of-way (Access Board 2011, 8). The ADAAG has never had a section devoted specifically to public rights-of-way, despite draft guidelines for public rights-of-way issued by the Access Board in 1992, 1994, 2002, 2005, and 2011 (Access Board 2011, 9-10).

Legally speaking, the ADA standards provide the technical definition of accessibility. If a sidewalk or any other facility complies with the standards, it is legally accessible. Guidelines, whether recommendations or legal standards, set minimums and maximums that must be met, but if they are met then the improvement is considered accessible. Concern for the technical aspects of the accessibility in the built environment suggests the principle of adequacy.

Pedestrianism also suggest the principle of adequacy, but while pedestrianism focuses on maximizing the flow of pedestrians on the sidewalk, accessibility standards focus on making the sidewalk accessible to a greater range of human bodies. An example of the difference between these two perspectives is their views on sidewalk width. Both define areas within the sidewalk with a minimum width and height that must be kept clear to allow the free flow of people.

However, while pedestrianism tends to allocate more space than the minimum physical space necessary for walking pedestrians in order to take into account people's need for space and the ability to pass each other, the ADAAG sets dimensions that are just enough to barely accommodate the width and height of a wheelchair. Both are examples of applying the principle of adequacy to what improvements should be and are made, but they produce different outcomes.

Accessibility standards are one approach to rectifying inaccessible building practices and standards. Standards of adequacy have their limitations, however. First, the standards must be written for a particular “design disability.” That is, there must be a defined set of idealized users whose particular functional limitations establish the design constraints. For example, standards for the timing of “walk” signals at street crossings must have a theoretical slowest walker in mind to make sure that the crossing phase is long enough for that person to cross. That theoretical slowest walker is the design disability. The 2011 Proposed Accessibility Guidelines for Public Rights-of-Way require that pedestrian signal phase timing be calculated using a walking speed of 3.5 feet per second (Access Board 2011, section R306.2). But what about people who walk even slower than 3.5 feet per second? Standards may say that such a street crossing is accessible, but in fact it will not be accessible to people who walk slower than the design disability. The best standards are expansive and comprehensive, but using technical limits necessarily will leave some users out. The limitations of defining design disabilities can be a problem especially because of the diversity of human abilities.

A second limitation of adequacy standards is that they ignore the potential to do much better than simply be adequate. Accessibility standards only set the minimum threshold for accessibility, but do not consider the quality, comfort, or ease of using facilities beyond base access. Truly accessible environments require design that goes beyond minimum standards.

An alternate solution to inaccessible standards is universal design. As applied across design fields, from architecture to the design of consumer products, universal design seeks to make things usable to the greatest number of people with the fewest adaptations (Center for Universal Design 1997). Universal design shares with technical standards an emphasis on technological solutions by enlightened designers, but it seeks to foster creative solutions that will be applicable beyond any specifically design disability that a single designer could identify. The term “universal design” was chosen in particular as a way out of thinking in terms of “special needs” (Null and Cherry 1996, 2). Related to its universal approach for all people, universal design is offered as a way to advance social integration (Imrie and Hall 2001, 14). “Universal design asks that designers create spaces and products that adapt to people as individuals and that strengthen their sense of themselves as capable and independent” (Null and Cherry 1996, 27). This suggests an invocation of the principle of equal opportunity. Universal design adds the context of equal opportunity to the principle of adequacy suggested by technical standards.

Imrie and Hall (2001) critique universal design as too focused on control by the designer and on technical solutions. They advocate for what they call inclusive design: pursuing the goals of universal design, but by incorporating end users as participants in the design process. To the adequacy and equal opportunity of universal design, inclusive design adds the dimension of participation. Depending on who is initiating the participation, this can evoke either or both of two different principles within the equity family of proportionality. If

participation is initiated by the designers as a way to elucidate and uncover user preferences that the users might not otherwise have an opportunity to openly express, then inclusive design can be an application of proportionality to preferences. On the other hand, if participation is initiated by the users as way to makes appeals for their needs, then inclusive design can be an application of proportionality to advocacy.

This chapter introduced three fields of ideas that likely influence how local officials think about equity when planning accessibility improvements to pedestrian rights-of-way: the meaning of disability, the purpose of the sidewalk, and the definition of accessibility. The influence of these ways of thinking may be apparent in formal rankings or implementable criteria that local officials use to make systematic decisions. In practice, however, local officials are unlikely to explicitly or consciously cite these theories in their decisions. Observers of public works planning claim that public officials are more likely to use informal methods to make decisions, rather than systematic approaches that tie decisions to clearly stated goals and objectives (Calia 2001; Neumann and Markow 2004). Informal methods, including following “gut feelings,” established customs, or the personal preferences of political leaders, may be complex but are not systematic. Under informal decision-making methods, the importance of the views and backgrounds of individual local officials become even more important. Precisely because those views and backgrounds are not stated, questioned, or debated when informal methods are used, they become even more germane to the prioritization of pedestrian accessibility.

The following table summarizes the concepts described in this chapter and the equity principles that they suggest.

Table 2. Relevant Traditions and Corresponding Equity Principles (Page 1 of 2)

	Concept	Compatible Equity Principles
Definitions of Disability	Economic Model of Disability	<i>Proportional to Need (Balancing Costs)</i>
	Sociopolitical Model of Disability	<i>Equal Opportunity</i> <i>Equal Benefits</i>
	Minority Model of Disability	<i>Redress</i> <i>Proportional to Advocacy</i>
Disability Law	Reasonable Accommodation in the Rehabilitation Act of 1973 and the ADA	<i>Proportional to Need (Balancing Costs)</i> <i>Cost Efficiency</i>
	ADA	<i>Cost Efficiency</i> <i>Equal Opportunity</i>
	Department of Justice Regulations Enforcing the ADA	<i>Formal Equality of Opportunity to access government services</i>
	Court Decisions and Settlements for ADA Pedestrian Access Cases	<i>Fair Equality of Opportunity to use the pedestrian network</i> <i>Advocacy</i>
	Court Decisions for ADA Employment Cases	<i>Proportional to Need (Balancing Costs)</i>

Table 2. Relevant Traditions and Corresponding Equity Principles (Page 2 of 2)

	Concept	Compatible Equity Principles
Purpose of the Sidewalk	Civic Humanism	<i>Fair Equality of Opportunity to participate in society</i>
	Pedestrianism	<i>Adequacy</i>
	Complete Streets	<i>Adequacy</i> <i>Equal Benefits</i>
	Public Health	<i>Proportional to Need for physical activity</i> <i>Operational Efficiency</i>
	Traffic Safety (Safe Routes to Schools)	<i>Proportional to Current Danger (Need)</i> <i>Operational Efficiency</i>
	Environmental Benefit	<i>Proportional to Current Pollution</i>
Definition of Accessibility	Technical Standards	<i>Adequacy</i>
	Universal Design	<i>Equal Opportunity</i>
	Inclusive Design	<i>Proportional to Preferences</i> <i>Proportional to Advocacy</i>

Method

There is a wealth of conceptions of equity available to guide local officials when deciding how to prioritize accessibility for pedestrians with disabilities. There is also a dense context of diverse, overlapping traditions of theory and practice that bring with them particular notions of fairness and equity. How do these influences affect the actual decisions that local government officials make? In order to uncover and analyze the equity implications of pedestrian accessibility policies and actions, I conducted a two-stage survey, offered as an online questionnaire to officials in local governments across the United States.

The content of both stages of the survey was based on background research, including reviewing documents and interviewing local officials and users of sidewalks. The first stage of my survey asked general, open-ended questions about the jurisdictions' strategies for improving accessibility in public rights-of-way. The second stage of the survey, sent as a follow-up questionnaire to first-stage respondents, asked more specific questions about which areas and facilities receive priority attention. I analyzed the results of both questionnaires by relating the responses to the taxonomy of equity principles introduced in chapter two. In this qualitative analysis, I identified several applied patterns within each of the taxonomy's principles, then coded the survey responses according to consistency with each of the specific applied patterns.

Background Research

Before writing the questionnaires as well as during the analysis, I supplemented the survey method with two other qualitative research methods: interviews and reviewing documents. At the earliest stage of formulating the focus of my research in December 2011, I conducted interviews with ten individuals in three different states about their thoughts and experiences with pedestrian accessibility. The interviews asked about accessible features, barriers to accessibility, and different possible prioritization strategies for improving accessibility. The respondents included people who had experienced temporary mobility disability due to injury or who had family members with temporary or permanent mobility disabilities, but did not include anyone with a permanent mobility disability themselves. Although the small sample size of these interviews prevented the results from being useful for identifying the most common opinions or prioritization strategies, it did help to identify the wide range of ideas and ways of viewing the question of equity in accessible streets. I incorporated these ideas into my survey design and analysis.

Also in December 2011, I conducted two interviews with officials at the City of Boston. These interviews were longer, each lasting approximately forty minutes, and asked about internal actions and policies at city hall related to improving accessibility for pedestrians with disabilities. As with the user interviews, the sample size of these interviews was too small to draw conclusions about general trends but did help to identify the universe of approaches and strategies that my surveys would have to address.

In addition to interviews, I researched documents to identify the current state of policies and prioritization strategies for providing accessible streets. One type of document I reviewed was official accessibility guidelines and standards, including federal models in the Access Board's 2004 ADAAG and 2011 Proposed Accessibility Guidelines for Public Rights-of-Way (Access Board 2011) as well as a state model in the rules and regulations of the Massachusetts Architectural Access Board (521 C.M.R.). I also reviewed official policies and budgets in various cities as well as court decisions and settlements, including *Barden* (2002), *Frame* (2011), and the others discussed in the previous chapter. These official documents further helped to identify the range of possible accessible facilities and prioritization strategies to address in my surveys.

One intriguing prioritization strategy comes not from any official document, but from a proposal for Los Angeles by Donald Shoup, a planner and professor at UCLA. Shoup (2010) proposes a point-of-sale infrastructure program for the City of Los Angeles in which property owners would have to pay for the cost of bringing the adjacent sidewalk into compliance with the ADA before they sell the property. The proposal is noteworthy because it expands the range of possibilities for improving accessibility by offering a market-driven strategy with high operational efficiency. Shoup's article in the *Journal of Urban Planning and Development* presenting the proposal is also noteworthy for being, to my knowledge, the only article in an academic planning journal to date that directly addresses the issue of providing accessible pedestrian rights-of-way for people with disabilities.

First Questionnaire

The first stage of my survey gathered general information on how local governments have evaluated and prioritized pedestrian accessibility in their jurisdictions. To choose which cities and counties to send the first online questionnaire to, I first compiled a list of all local government jurisdictions in the United States which build and maintain sidewalks for a residential population of more than 100,000 people. I did not include state governments, since I expected that state highway departments tend to be responsible for major highways and work less often with the kinds of urban streets that my survey was interested in. Although counties in all states are responsible for some roads, I only included counties where at least 100,000 residents live outside of any municipality or other sub-county jurisdiction responsible for roads.

I estimated populations using two data sets of the U.S. Census Bureau: the American Community Survey 5-year estimates for 2006-2010, and the Population Estimates Program estimates for July 1, 2009. Both programs provide estimates only, so the 100,000 population criterion is a soft cut-off, not a hard limit. There is nothing inherent to my research question that requires any kind of population limit. Rather, the approximate population cut-off was a somewhat arbitrary way to limit the number of potential cases and a way to make it more likely that my subjects have the population demand and administrative capacity to address the issue of accessible streets.

The full list contained 400 jurisdictions including counties, cities, consolidated city-counties, and towns. Using a random number generator, I

randomly ordered this list and began sending surveys out in the list order. Over the course of this research project, I made contact down to the forty-eighth jurisdiction on the list. For each jurisdiction that I contacted, I searched its website to find contact information for up to three officials who might have the information to answer the survey, including disabilities coordinators, public works managers, and chief engineers. I sent emails with links to the online questionnaire to all possible contacts, with a request that the survey be forwarded if the recipient was not the best person to answer the survey. In cases where email addresses were not directly available from the website or the correct recipient was not clear, I called by telephone to determine where to send the questionnaire.

The first questionnaire was short, with mostly multiple-choice questions. The questions addressed four main areas of interest: the general priority given to pedestrian accessibility compared to other priorities and other public works; past evaluations of accessibility and their results; implementation plans and their origins; and specific improvements and priorities within the jurisdiction's implementation plans or practices. The last area of interest was covered by two open-ended questions, numbered 6 and 7, that asked respondents to describe their city or county's current practices. The complete first questionnaire is provided in Appendix A.

Between February and April, 2012, I contacted 48 cities and counties and received responses from 29 of them. Of these responses, five were from officials who reported that their jurisdiction is not responsible for sidewalks, leaving 24 completed questionnaires for the first stage of the survey.

Second Questionnaire

The second stage of the survey was also an online questionnaire, but longer and with more detailed questions about how exactly the local governments prioritize accessibility improvements. The second questionnaire was essentially an elaboration of the two open-ended questions in the first questionnaire, questions 6 and 7, which asked about specific prioritization strategies. The main sections of the second questionnaire addressed five variables that implementation strategies might prioritize on: equalizing efforts according to some criteria (question 3 and its follow-up sub-questions); prioritizing based on location (question 4 and follow-up); prioritizing based on the type of improvement or facility (question 5 and follow-up); prioritization based on type of intervention, e.g. alterations versus building new facilities (question 6 and follow-up); and measures of output or progress (question 7 and follow-up).

Recognizing that the open-ended questions in the first questionnaire tended to produce vague answers, I designed the second questionnaire to be almost completely multiple choice. For example, the section on prioritization by location contained long lists of 37 possible priority locations in seven categories, from “near government buildings” to “new developments,” as well as space for respondents to add other locations to the list. The respondents were asked to rank the relative priority of these possible locations, from first-level priority to not a priority. The exceptions to the multiple choice format were the “other” categories, spaces for respondents to clarify their answers, and one final open-answer question which asked the respondent to give the “highest priority objective” of

their city or county's efforts for pedestrian accessibility. The complete second questionnaire is provided in Appendix B.

Keeping to multiple choice questions required that I anticipate the range of possible answers and include as many as possible in the questionnaire. This is where my background research of conducting interviews and reviewing guidelines and policies became particularly useful. The complete questionnaire thus is not only a part of a survey method, but is also a reasonably comprehensive list of the possible improvements, locations, and strategies that a local government might consider. Although the questionnaire was used in this research project to descriptively analyze what cities' and counties' priorities are, it could also be used as a proscriptive tool to decide what a given community's priorities should be.

Although in many respects the list of specific accessibility improvements in the second questionnaire corresponds to lists of improvements in the ADAAG and other guidelines, I chose not to include specific dimensions in the questionnaire's list. Instead, the questionnaire focused on the type of improvement rather than the standards relating to that improvement or facility. For example, where the Access Board's 2011 Proposed Accessibility Guidelines for Public Rights-of-Way specifies that the pedestrian access route must have a continuous clear width of at least 4.0 feet (Access Board 2011, R302.3), the second questionnaire lists merely "greater path width" as a possible specific improvement without referencing a particular standard. This approach allows the

survey question to capture practices that are either stricter or more lenient than the official standards.

Although the purpose of the survey was to uncover the principles of equity manifested in local governments' policies and practices, I chose not to ask respondents about equity principles directly. The questionnaires included neither the taxonomy of equity principles nor specific mention of any of the equity principles by name. A survey that asked respondents directly to choose which equity principle best identified their local government's practices would require that all respondents fully understood, and equally understood, what exactly each of the principles mean. Considering the difficulty of defining equity principles and the various names that they are known by, I doubt that any print or online survey could reliably explain and gather information about these principles by name. Instead, I designed the survey so that respondents could directly describe their local government's practices and policies without reference to my taxonomy. Then in my analysis of the survey results, I could classify those practices and policies by the equity patterns that they illustrate. In addition to being more reliable, this method limits response bias. Terms for equity conceptions, such as "equality" or "cost efficiency," come loaded with positive and negative associations that may cause respondents to answer according to their reaction to the term, rather than according to the actual actions of their local government. Asking about the local governments' actions directly is less susceptible to response bias.

Between April and July, 2012, I contacted all 22 jurisdictions where the respondent to the first questionnaire expressed willingness to be contacted for follow-up. I received 20 completed questionnaires for the second stage of the survey. Because of all the jurisdictions that I contacted for the second questionnaire had already completed the first questionnaire, each of the 20 completed second-stage questionnaires matches up to a completed first questionnaire from the same city or county. In two cases, I helped complete the questionnaire on behalf of the respondent. In both cases, the respondent had provided a policy document that outlined how priorities are selected, which I used to answer the survey questions. In one of these cases, I filled out the second questionnaire on behalf of the respondent, following the policy as outlined in the provided document. In the second case, the respondent did complete a questionnaire himself, but left a number of key questions blank. I supplemented this respondent's answers by filling in some of the blanks by referring to the policy document. From the first and second stages of the survey, in the end I had 20 complete surveys to include in my analysis.

Applied Patterns

The purpose of the surveys was to identify the specific prioritization strategies that cities and counties undertake, in order to classify those strategies by the equity principles that they display. However, there is not a simple one-to-one correspondence between implementation strategies and equity principles. The same type of equity can produce very different answers to the survey depending on how it is conceived. For example, strategies that prioritize based on need can

look very different depending on what definition of “need” they use, yet all are examples of prioritizing based on need. The taxonomy of conceptions of equity introduced in chapter two is not specific enough to adequately characterize the prioritization strategies as captured in the survey results.

To provide more specificity for my analysis, I further refined my taxonomy to include specific observable “applied patterns” within each principle of equity. I determined the list of possible applied patterns based on my background research as well as the specific responses to the surveys that I obtained. The applied patterns and how they fit into the taxonomy are outlined below.

Table 3. Taxonomy of Conceptions of Equity with Applied Patterns (Page 1 of 4)

Family	Principle	Operational Criteria	Selected Applied Patterns
Adequacy	(Adequacy)	<i>What facilities and services define adequacy</i> <i>What to do first</i>	<ul style="list-style-type: none"> • Prioritize improving inadequacies that are farthest from being adequate • Prioritize improving inadequacies that are the closest to being adequate
Equality (continues on next page)	Equal Inputs	<i>Equality by what characteristic of the environment</i> <i>What inputs in those environments</i>	<ul style="list-style-type: none"> • Equal resources for each administrative district • Equal resources by area of district • Equal resources by length of pedestrian network • Equal resources by total pedestrian traffic • Equal resources by traffic of pedestrians with disabilities • Equal resources by total population • Equal resources by population of people with disabilities
	Equal Opportunity	<i>How to define opportunity</i> <i>Opportunity for what</i>	<u>Formal Equality of Opportunity</u> <ul style="list-style-type: none"> • Formal Equality of Opportunity to use the pedestrian network • Formal Equality of Opportunity to access government services • Formal Equality of Opportunity across major life activities including employment <u>Fair Equality of Opportunity</u> <ul style="list-style-type: none"> • Fair Equality of Opportunity to use the pedestrian network • Fair Equality of Opportunity to access government services • Fair Equality of Opportunity across major life activities including employment

Table 3. Taxonomy of Conceptions of Equity with Applied Patterns (Page 2 of 4)

Family	Principle	Operational Criteria	Selected Applied Patterns
Equality (continued)	Equal Outputs	<i>Equality by what characteristic of the environment</i> <i>What outputs in those environments</i>	<ul style="list-style-type: none"> • Equal output for each administrative district • Equal output by area of district • Equal output by length of pedestrian network • Equal output by total pedestrian traffic • Equal output by traffic of pedestrians with disabilities • Equal output by total population • Equal output by population of people with disabilities
	Equal Benefits	<i>Equality by what characteristic of beneficiaries</i> <i>What impacts on those beneficiaries</i>	<ul style="list-style-type: none"> • Equal pedestrian access for people at all points on the range of physical abilities
Just Inequality	Principle of Redress (compensatory)	<i>What inequalities to address</i> <i>What inputs/outputs/impacts to address them</i>	<ul style="list-style-type: none"> • Redress for people with disabilities • Redress for people with economic or social disadvantages
	Difference Principle (maximize the minimum)	<i>Who is least advantaged</i> <i>How to measure benefit for the least advantaged</i>	<ul style="list-style-type: none"> • Prioritize improvements that benefit a wide range of people and also specifically benefit people with the most severe disabilities
	Utilitarianism (maximize total utility)	<i>How to approximate utility</i> <i>What distribution of benefits will maximize total utility</i>	<ul style="list-style-type: none"> • Maximize the fulfillment of average satisfactions • Maximize the utility of people who have the most to gain from the most achievable accommodations • Maximize the number of people benefited

Table 3. Taxonomy of Conceptions of Equity with Applied Patterns (Page 3 of 4)

Family	Principle	Operational Criteria	Selected Applied Patterns
Proportionality	Proportional to Need	<i>What needs</i> <i>What inputs/outputs/impacts to meet those needs</i>	<ul style="list-style-type: none"> • Proportional to total pedestrian traffic • Proportional to traffic of pedestrians with disabilities • Proportional to total population • Proportional to population of people with disabilities • Proportional to need for safety among the general population • Proportional to need for physical activity among the general population • Proportional to severity of disability
	Proportional to Demonstrated Use	<i>How to measure use</i> <i>What inputs/outputs/impacts</i>	<ul style="list-style-type: none"> • Provide facilities in proportion to the demonstrated use by people who specifically benefit from those facilities • Proportional to demonstrated total pedestrian traffic • Proportional to demonstrated traffic of pedestrians with disabilities in general
	Proportional to Preferences	<i>How is interest demonstrated</i> <i>What inputs/outputs/impacts</i>	<ul style="list-style-type: none"> • Prioritize improvements as identified from public outreach
	Proportional to Advocacy	<i>How to measure strength of demands</i> <i>What inputs/outputs/impacts</i>	<ul style="list-style-type: none"> • Prioritize improvements as requested by individuals, advocacy groups, and advisory boards
	Proportional to Contribution	<i>How to measure contribution</i> <i>What inputs/outputs/impacts</i>	<ul style="list-style-type: none"> • Proportional in each district to tax contributions from that district • Proportional in each location to coproduction contributions for that location

Table 3. Taxonomy of Conceptions of Equity with Applied Patterns (Page 4 of 4)

Family	Principle	Operational Criteria	Selected Applied Patterns
Efficiency	Cost Efficiency	<i>Are costs rising or falling</i> <i>Cost of what inputs</i> <i>What outputs/impacts</i>	<ul style="list-style-type: none"> • Prioritize the least costly of adequate improvements (Cost efficiency with falling costs) • Prioritize the most costly of committed improvements (Cost efficiency with rising costs)
	Operational Efficiency	<i>What other projects or exiting priorities to combine with</i>	<ul style="list-style-type: none"> • Coordinate improvements with existing project schedules • Prioritize improvements eligible for outside funding • Minimize the potential of costly legal action against the local government • Alternate priority: prioritizing pedestrian transportation mode

The applied patterns for each equity principle come out of the different possible answers to the operational criteria. The two patterns for adequacy differ by their answer to the criterion of what to do first. As pointed out in chapter two, one pattern is to prioritize the least adequate facilities and locations first, while the other pattern is to concentrate on improving the inadequacies that are closest to being adequate. In the analysis, as we will see in the next chapter, often it was not possible to determine which of the two patterns of adequacy was being put into practice. In these cases, the responses were coded as simply adequacy, without an applied pattern specified. I used this catch all coding in a number of other principles for similar reasons, as noted below.

The seven applied patterns for the principle of equal inputs differ according to their answer to the criterion of equality by what characteristic of the environment. While the choice of inputs used to measure equality, whether dollars spent, staff time or some other measure of resources, can also produce different applied patterns, I chose not include those differences in my analysis. Instead I focused on the characteristics of the environment that the strategies attempt to provide equal inputs for. Some examples may help clarify what the selected applied patterns mean. An applied pattern that equalizes by administrative district would make sure that each city councilor district or defined neighborhood, for example, received equal resources, regardless of differences in population or terrain. In an applied pattern that equalizes by area, a one-square-mile neighborhood would get twice as many resources as a half-square mile neighborhood. In an applied pattern that equalizes by length of the street network,

a one-mile street would get twice as many resources as a half-mile street. If the length of the existing pedestrian network specifically were the characteristic to equalize by, a one-mile street with sidewalks on both sides (for a total of two miles of sidewalk) would get four times as many resources as a half-mile off-street path (one half mile of sidewalk). An applied pattern that equalizes by total pedestrian traffic would devote twice as many resources to a route with 100 daily pedestrian passings than to another route with 50 daily passings. If the applied pattern focuses instead on the pedestrian traffic of people with disabilities in particular, then a route with 10 daily passings by pedestrians with disabilities would get twice as many resources as a route with 5 daily passings by pedestrians with disabilities. In an applied pattern that equalizes by total population, a neighborhood of 10,000 residents would get twice as many resources as a neighborhood of 5,000 residents. Similarly, an applied pattern that equalizes by the population of people with disabilities would spend twice as many resources in a neighborhood with 1,000 residents with disabilities as in another neighborhood with only 500 residents with disabilities. As with adequacy, during analysis it was clear that some respondents were applying a version of the principle of equal inputs but I was not able to determine which specific applied pattern fit. I coded these cases as generally equal inputs without a specific applied pattern.

The applied patterns for equal opportunity are divided between formal equality of opportunity and fair equality of opportunity. In each of these two groupings, there are three applied patterns which differ by what opportunity is being provided. The first possible opportunity is the opportunity to use the

pedestrian network itself, without regard to the purpose or destination of that use. The second possible opportunity, particularly relevant in the case of analyzing equity in government services, is the opportunity to access and benefit from government services. In this second pair of equal opportunity applied patterns, the ability to use the pedestrian network to access other destinations or for any other reason is not considered significant. Although there are many possible opportunities that pedestrian rights-of-way can help provide, the last pair of applied patterns attempts to broadly capture the other opportunities, including access to employment.

The principle of equal outputs mirrors the principle of equal inputs and shows the analogous seven applied patterns. As with equal inputs, the applied patterns for equal outputs differ by what characteristic of the environment the strategies attempt to provide equal outputs for, whether by administrative district, area, population, or other criteria. During analysis, I discovered that my survey questionnaire was not well designed to capture the differences between the applied patterns for equal outputs. Question 3(a) in the second questionnaire asked if any of those seven characteristics of the environment are used to equalize resources, but the wording of the question specifically referenced making the inputs equal, not the outputs. There were other questions that distinguished whether the responding city or county used an equal outputs approach, but question 3(a) was the only source for distinguishing among the different applied patterns of equal outputs. For this reason, it was not possible to distinguish among the applied patterns for equal outputs in many of the responses, even when it was

clear that some form of equal outputs was being practiced. In these cases, I coded the response as generally equal outputs.

Applied patterns for the principle of equal benefits would be distinguished by how they classified people according to their characteristics. My survey did not ask specifically about different types of disabilities or mobility aids, and for this reason did not capture how different cities and counties classify people for the purposes of equalizing benefits among them. Furthermore, none of the open-answer responses suggest that any of the respondents use a version of the principle of equal benefits. It seems that my survey instrument was not well designed to capture this principle. None of the possible applied patterns for equal benefits are present in the responses to my survey. The one applied pattern listed here is thus a place-holder that does not offer any more specificity than the meaning of the principle itself. My experience with failing to measure equal benefits gives support to Crompton and West's contention that the principle of equal benefits is not operational (Crompton and West 2008, 46).

The principle of redress suggests two applied patterns in practice. These two patterns differ by what inequality they try to address. The first is the redress for people with disabilities. The second applied pattern is redress generally for people with economic or social disadvantages, including those who do not have disabilities.

The difference principle is difficult to put into practice because it requires a careful definition of who is the least advantaged and a sensitive measure of benefit for that group. In my background research as well as the responses to my

survey, I observed one applied pattern that implemented the difference principle. That pattern is to prioritize improvements that generally benefit a wide range of people and also specifically benefit people with the most severe disabilities. One example would be prioritizing improvements to the pedestrian network in locations that are near medical facilities. Everyone visits the doctor from time to time, making the sidewalks around hospitals and doctors' offices high-traffic areas. Pedestrian improvements in these high-traffic areas will provide benefit to anyone who visits the doctor, which is to say everyone. At the same time, people with the most severe disabilities are likely to have medical complications related to their impairments, and so are likely to frequent those same medical facilities even more often. The pedestrian improvements near medical facilities thus might benefit people with the most severe disabilities even more than the average person. In this formulation, people with the most severe disabilities are the least advantaged. Benefit to them is maximized by concentrating on improvements that will also benefit a wide range of other people, thus helping to ensure support for the expense of making those improvements.

Putting utilitarianism into practice faces similar problems as the difference principle. Utilitarianism requires a very sensitive measure of utility that can be measured and used reliably across all members of society. One approach to simplifying utilitarianism is the applied pattern of seeking to maximize the fulfillment of average satisfactions. This applied pattern assumes that all people are the same and want the same things. The sameness is determined by taking an average of every person's individual wants and needs, that is, by finding the

“average satisfaction.” The result for the pedestrian network will be facilities optimized for “normal” able-bodied pedestrians. This is essentially the applied pattern described by Hahn’s Los Angeles planner, mentioned in chapter three, who noted that the built environment is designed for “the average human being, plus or minus half a standard deviation” (Hahn 1986, 273).

A second possible applied pattern of utilitarianism focuses not on the average person but on those people who can achieve the biggest gains in net satisfaction. Physically mobile able-bodied people already get plenty of utility from the existing pedestrian network, and would be unlikely to gain more utility from further improvements. At the other end, people with the most severe disabilities and greatest mobility impairments might be able to get much more utility from a more accessible pedestrian network, but would be unlikely to ever gain a significantly large amount of utility from mobility. The people whose increase in utility has the greatest potential to significantly increase aggregate utility are people with few or only one discrete impairment who but for the disabling environment would be highly independent and high-achieving members of society. For example, this might include individuals who are blind or use a wheelchair but have no other disabilities. This second applied pattern of utilitarianism would thus prioritize improvements that benefit those who have the most to gain from the most achievable accommodations.

A third possible applied pattern of utilitarianism approximates aggregate utility by simply maximizing the total number of people benefited. This is similar to prioritizing based on pedestrian traffic, but also takes into account the potential

to dramatically increase pedestrian demand and use in locations where adequate facilities are currently lacking. In addition, this applied pattern prioritizes facilities that answer the needs of the most common disabilities, such as benches for people with difficulty walking for long distances or strongly contrasting colors making the edge of the path visible for people with difficulty seeing.

The principle of proportionality to need requires that a particular need be identified. The various applied patterns for this principle therefore differ by what need the pedestrian network is answering. If the purpose of the pedestrian network is transportation, as pedestrianism holds it to be, then proportionality to need can take the form of making improvements in locations in proportion to the total pedestrian traffic in those locations. Proportionality to total pedestrian traffic, as a classification of applied patterns, includes patterns from the principles of equal inputs and equal outputs that ensure equality by total pedestrian traffic. However, proportionality to total pedestrian traffic also includes patterns that give extra attention and priority to the most heavily traveled areas. I also make a distinction between proportionality to total pedestrian traffic, as an application of the principle of proportionality to *need*, and proportionality to demonstrated total pedestrian traffic as an application of the principle of proportionality to *demonstrated use*. While pedestrian traffic as a measure of need would necessarily encompass demonstrated traffic in the past, it can also include expectations of future traffic. For this reason, the applied pattern of proportionality to total pedestrian traffic, in addition to including applied patterns

from the principles of equal inputs and equal outputs, also includes the applied pattern of proportionality to demonstrated total pedestrian traffic.

If the need met by pedestrian accessibility improvements is not total pedestrian traffic but traffic particularly by pedestrians with disabilities, then proportionality to need can take the form of making improvements in locations in proportion to the traffic of pedestrians with disabilities in those locations. As with the more general pattern of proportionality to total pedestrian traffic, the more specific applied pattern includes the corresponding applied patterns from the principles of equal inputs, equal outputs, and proportionality to demonstrated use.

Two other applied patterns of the principle of proportionality to need also include, and expand on, applied patterns from the principles of equal inputs and equal outputs. These two are proportionality to total population and proportionality to the population of people with disabilities. In both of these applied patterns, the population of an area stands in as a measure of the need for pedestrian facilities in that area. The two differ only by whether the population in question is the total population or the population of people with disabilities.

As we have seen in chapter three, the free flow of pedestrians is not the only possible purpose of the sidewalk and not the only need that the pedestrian network can answer. If need is conceived as a need for safety, then the principle of proportionality to need can take the form of making improvements in proportion to a need for safety in the general population. This applied pattern includes prioritizing locations that are currently the least safe, as well as prioritizing types of facilities that are most closely related to providing safety,

such as having crosswalk striping and pedestrian signals at street crossings. Another purpose of the sidewalk can be its role in encouraging physical activity. In this conception, proportionality to need can take the form of making improvements in proportion to the need for physical activity among the general population. This applied pattern would prioritize projects in neighborhoods with the least inviting pedestrian environments and the lowest rates of physical activity.

One final applied pattern of the principle of proportionality to need is prioritization in proportion to the severity of the disability. In this conception, the need is the disability itself. People who have disabilities that more severely limit their lives have a greater need for physical accommodations in the pedestrian network. For example, applications of this pattern might put more emphasis on curb ramps, which are necessary for people who cannot walk and therefore use wheelchairs, rather than handrails, which are an aid to people who have some ability to walk. A prioritization strategy that responds to this need would indeed be implementing the principle of proportionality to need.

Applied patterns of the principle of proportionality to demonstrated use can measure use either simply by location or more complexly by the type of facility and the location. If measurement of demonstrated use is focused on the facility, then a possible applied pattern is to provide particular types of facilities in proportion to the demonstrated use by people who specifically benefit from those facilities. For example, this applied pattern holds that a city should prioritize constructing and maintaining curb ramps in areas where officials observe the most people in wheelchairs using existing curb ramps. Similarly, the city should

prioritize installing and maintaining audible pedestrian signals where officials observe the most blind people crossing the street. Instead, if demonstrated use is focused just on the location, then two possible applied patterns are to make improvements in proportion to the demonstrated total pedestrian traffic or the demonstrated traffic of pedestrians with disabilities. As noted above, these two applied patterns are encompassed by the corresponding applied patterns from the principle of proportionality to need.

The next two principles of proportionality, proportional to preferences and proportional to advocacy, each have one representative applied pattern. Preferences, as described by Lucy (1981) and adopted in my taxonomy, are not openly expressed through use or direct advocacy. Instead, local officials must draw out the preferences of people who use the pedestrian network through surveys and other forms of outreach. The sample applied pattern for proportionality to preferences is thus to prioritize improvements that are identified through those forms of public outreach. Advocacy, on the other hand, is expressed through demands and requests. The sample applied pattern for proportionality to advocacy is to prioritize improvements as requested by individual citizens, organizations, or official advisory bodies.

The two applied patterns for the principle of proportionality to contribution differ according to their answer to the criterion of how to measure contribution. If the contribution is measured as taxes paid, then the applied pattern will be to make improvements in each district or location in proportion the taxes paid by people and properties in that district. In practice, this applied pattern

prioritizes improvements in central commercial areas and high-cost residential areas. If contribution is instead measured as coproduction contributions, such as volunteering time or raising private money, then the applied pattern will be to make improvements in each location in proportion to the coproduction contributions for that location.

The principle of cost efficiency can be divided by whether costs are assumed to be rising or falling. With falling costs, which is the usual assumption, the applied pattern will be to prioritize the least costly of adequate improvements. With rising costs, the applied pattern will be to prioritize the most costly improvements. In my analysis, it was not always clear which assumption a city or county was making even when it was clear that it was implementing some kind of prioritization based on cost efficiency. As with adequacy, equal inputs, and equal outputs, I coded these cases as cost efficiency without specifying an applied pattern.

The final principle in my taxonomy, operational efficiency, is represented by four applied patterns. The first is to coordinate improvements with existing project schedules, such as determining a schedule for sidewalk reconstruction based on an existing schedule for the reconstruction of adjacent streets. Presumably, this existing schedule was decided according to criteria other than the accessibility of the sidewalk. Shoup's proposal to require that improvements be made at the point of sale (Shoup 2010) is also an example of following a schedule that is determined otherwise, even though the schedule of when properties are sold is neither controlled by the local government nor even possible

to predict in most cases. A second applied pattern of the principle of operational efficiency is to prioritize improvements that are eligible for outside funding, either based on the type of facility or the location of the improvement. Avoiding legal liability can be a priority for a local government, so a third applied pattern of the principle of operational efficiency is to minimize the potential of costly legal action. This pattern will overlap with proportionality to advocacy, since legal action is a form of advocacy. One final applied pattern that I noted in my analysis is exhibited by cities and counties that made accessibility improvements not so much as part of policy toward people with disabilities, but rather as part of an overall policy to prioritize walking over other modes of transportation, particularly driving.

These applied patterns became part of my methodology because they allowed me to code the survey responses into categories that reliably correspond to equity principles. These applied patterns are merely “samples” and are not intended to be exhaustive or comprehensive of all the possible implementations of the equity principles that I identified in my taxonomy. However, they do represent the patterns that I was able to observe using my survey as a research instrument.

Coding Responses

Once I had identified the various applied patterns within each of the relevant principles of equity, I wrote a program using simple Stata code to assign scores for each pattern of equity. Because I wrote the code, it reflects my judgment of what answer represents what pattern of equity, and to what degree. As the decisions of one researcher, this method limits the reliability of the

research, since other researchers might make other judgments. However, by writing those judgments into the code I forced my scoring to be consistent across survey respondents and left my judgments open to be analyzed and modified by other researchers, thereby improving reliability. A codebook for the second survey is provided in appendix C, which can be used to follow the Stata code reproduced in appendix D.

Without repeating the entire contents of the coding strategy, I offer highlights of some of the important features and major decisions in the coding. A given question or sub-question in the survey questionnaires will not be relevant to all the identified applied patterns of equity. Consequently, the number of questions that are relevant to each applied pattern is different for different patterns. The range is from three questions for the applied patterns in the principle of equal inputs to thirty-four questions for fair equality of opportunity to use the pedestrian network. The coding normalized each survey respondent's score for each equity pattern by dividing the number of answers matching the particular equity pattern by the total possible questions that addressed that pattern. This produced a set of scores each in a range from 0 to 1.

For all applied patterns, two of the possible relevant answers are drawn from the open-answer question in both surveys. Questions 6 and 7 in the first questionnaire, which asked respondents to describe what improvements their city or county makes for accessibility and how they prioritize among them, together count as one possible answer for each equity pattern. Question 8 in the second questionnaire, which asked them to list their city or county's "highest priority

objective” for pedestrian accessibility, counts as a second possible answer for each pattern. For each equity pattern, if the respondent mentioned or suggested that type of equity in a response to questions 6 or 7 in the first questionnaire, I coded it as one answer matching that pattern. Likewise, a mention or suggestion of an equity pattern in a response to question 8 in the second questionnaire earns one further answer for that pattern. Respondents thus can get a zero, one, or two out of two based on their responses to the open-answer questions.

For one pattern only, the operational efficiency pattern of coordinating improvements with other existing project schedules, I coded a matching answer for question 8 as long as somewhere in the survey the respondent mentioned that accessibility compliance is incorporated as a condition of permitting or approving private projects. In theory, compliance with the accessibility requirements of the ADA is a condition of all private projects, since ADA is a federal law. However, some of the jurisdictions in my survey sample use the permitting process to implement accessibility standards that are stricter than the current ADA standards. Furthermore, it is a significant reflection of a city’s priorities that accessibility is made an explicit condition of permitting, even when that condition would have legal effect regardless of the city’s prioritization strategy.

For questions in the survey that asked respondents to rank the priority of a given location, facility, or type of intervention, an answer of “first-level priority” earns full credit in that question for relevant equity patterns, while an answer of “second-level priority” earns half credit for those equity patterns. Answers indicating lower priorities earn no points for relevant patterns.

Several of the coding lines test whether one particular location or facility is given higher priority than a second location or facility. For example, rating “areas with the fewest existing pedestrian facilities” as higher priority than “areas with the most existing pedestrian facilities” is coded as suggesting the pattern of prioritizing improvements to inadequacies that are the least adequate. Rating “areas with the most existing pedestrian facilities” higher suggests instead the pattern of prioritizing improvements to inadequacies that are the closest to being adequate. A response earns full credit for an equity pattern if that pattern’s preferred location or facility is rated as higher priority than the less preferred location or facility. This holds true even if the preferred answer is rated “third or lower level priority,” so long as the less preferred answer is rated “not a priority” or “not considered.” If the answer for the less preferred location or facility is left blank, the coding reverts to giving full credit for rating the preferred location or facility a “first-level priority,” half credit for “second-level priority,” and no credit for lower priorities. If the answer for the preferred location or facility is left blank, the response cannot earn credit for that equity pattern.

Survey Results

Response Rate

For the first stage of the survey, I contacted 48 jurisdictions and received responses from 29 of them. Of these responses, five were from officials who reported that their city or county is not responsible for sidewalks, leaving 24 completed questionnaires for the first stage of the survey. This corresponds to a response rate of 60.4 percent counting all responses, and 50.0 percent counting only completed surveys. As table 4 on the next page shows, there was no significant difference in the distribution of population size between jurisdictions that responded and those that did not respond. Although the difference in maximum population between responding and non-responding jurisdictions seems large, this difference must be seen in the light of the fact that only two jurisdictions I contacted had populations over 800,000 (both of which responded). The response rate was similar for cities (57.6 percent) as for counties (66.7 percent).

However, the table shows that among jurisdictions that initially responded, there was a population difference between those with responsibility for the sidewalk and those without. Generally, jurisdictions without responsibility for the sidewalk have smaller populations than jurisdictions that reported they do have responsibility for the sidewalk. Even so, jurisdictions with sidewalk responsibility include some at just above 100,000, the low end of my sample's population range.

Table 4. Jurisdiction Population and Type by Response		Juris- dictions Contacted	No Response	Response Received		
				Total	Not Respon- sible for Sidewalks (Question- naire not completed)	Respon- sible for Sidewalks (Question- naire completed)
Number of Juris- dictions	Total	48	19	29	5	24
	Cities	33	14	19	2	17
	Counties	15	5	10	3	7
Population (Approximate)	Mean	283,273	267,951	293,312	177,258	317,490
	Median	177,339	184,488	176,843	159,611	177,339
	Minimum	100,000	100,000	101,000	101,000	101,000
	Maximum	1,500,000	790,000	1,500,000	330,000	1,500,000

For the second stage of the survey, I contacted all 22 jurisdictions where the respondent to the first questionnaire expressed willingness to be contacted for follow-up, and received 20 completed questionnaires. This corresponds to a response rate of 90.9 percent for the second stage alone, and 41.7 percent for both stages in combination.

Both the sample of jurisdictions that I contacted as well as the jurisdictions that completed both surveys are well distributed across the United States. I contacted cities and counties in twenty-two states. The twenty local governments that completed both stages of the survey represented thirteen different states: California, Colorado, Florida, Georgia, Hawaii, Louisiana, Maryland, Minnesota, Oregon, Pennsylvania, South Carolina, Texas, and Washington.

Responses to General Questions

Most of the questions in the first questionnaire and some in the second questionnaire asked for general background related to the efforts of cities and counties to make public rights-of-way accessible to pedestrians with disabilities. In addition to supplementing my classification by equity pattern, the general questions provide some of the background and context for these policies. The responses to general questions are summarized below. Although both stages of the survey were completed for only 20 local governments, the results below include all 24 responses to the first survey, unless otherwise noted.

First Questionnaire 3. How important is it to your local government that its public rights-of-way be accessible to people with disabilities?

A top policy priority.....	33%
One among many important policies	63%
A worthy goal, but not a priority	0%
Not at all important	4%

First Questionnaire 4. Has your local government ever undertaken a study or evaluation of how accessible its public rights-of-way are?

Yes, across all public rights-of-way in the jurisdiction	29%
Yes, for certain areas.....	58%
No.....	9%
Do not know.....	4%

First Questionnaire 4(a). Did any study undertaken by your local government evaluate the accessibility of its public rights-of-way based on any version of ADAAG or the proposed Guidelines for Public Rights-of-Way?

Percentage out of 21 respondents who answered yes to question 4.

Yes 95%

No..... 5%

First Questionnaire 4(b). Based on the most recent study, approximately what percentage of the total mileage of your public rights-of-way would qualify today as “accessible routes” under ADAAG?

Percentage out of 12 respondents who provided an answer to this question.

Less than 10% 8%

10-30% 33%

30-50% 17%

50-75% 17%

More than 75% 25%

First Questionnaire 5. Has your local government ever had an implementation plan for providing accessible public rights-of-way?

Yes 79%

No..... 13%

Do not know..... 8%

First Questionnaire 5(a). What were the origins of the implementation plan(s)?

Percentage out of 19 respondents who answered yes to question 5.

Percentages total to more than 100 because respondents could choose multiple answers.

Included as part of an ADA Transition Plan.....	79%
Self-initiated.....	47%
Requested by an advocacy organization or political group	32%
Required by a legal settlement.....	16%
Requested by the Department of Justice or other regulatory authority ...	5%

First Questionnaire 5(b). Does your local government currently follow an implementation plan for providing accessible public rights-of-way?

Yes	75%
No / Do not know / No response.....	25%

First Questionnaire 8. Estimated Budget for Accessibility Improvements

Out of 20 respondents who provided an answer.

Mean	\$1,300,000
Minimum.....	\$20,000
First quartile	\$230,000
Median	\$850,000
Third quartile	\$2,000,000
Maximum.....	\$5,000,000

First Questionnaire 9. Estimated Percentage of the Total Capital Budget that Goes to Accessibility Improvements

Out of 13 respondents who provided estimates for both the amount spent on accessibility improvements and the total capital budget.

Mean	8.2%
Minimum.....	0.01%
First quartile	0.6%
Median	1.6%
Third quartile	5.8%
Maximum.....	64.1%

Second Questionnaire 2. Who pays for sidewalk construction, maintenance, and repair in your jurisdiction?

Percentage out of 20 respondents who completed the second questionnaire.

Adjacent property owners	5%
Local government	35%
Cost shared between property owners and the government.....	60%

Equity Patterns

The main analysis of both surveys was a classification of how much each responding local government displayed the various equity patterns that I identified. The result of the coding gave each city or county respondent a set of scores, one score for each pattern of equity. The scores range from 0 to 1, from not at all present to very strongly present. These scores can be compared

horizontally within one respondent to say which equity pattern was strongest or weakest in a particular city or county. The scores can also be compared and averaged vertically to say which patterns of equity were the most prevalent.

The following chart (Figure 1) presents the overall average score for each pattern of equity. Most of the equity patterns have average scores between 0.1 and 0.3. The highest averages are for adequacy (0.37) and proportional to total population (0.38). To explain these numbers, the 0.37 for adequacy, for example, means that the local governments in my survey on average have practices that are a 37 percent match with the purest form of the principle of adequacy.

Figure 1. Average Scores by Equity Pattern (Page 1 of 3)

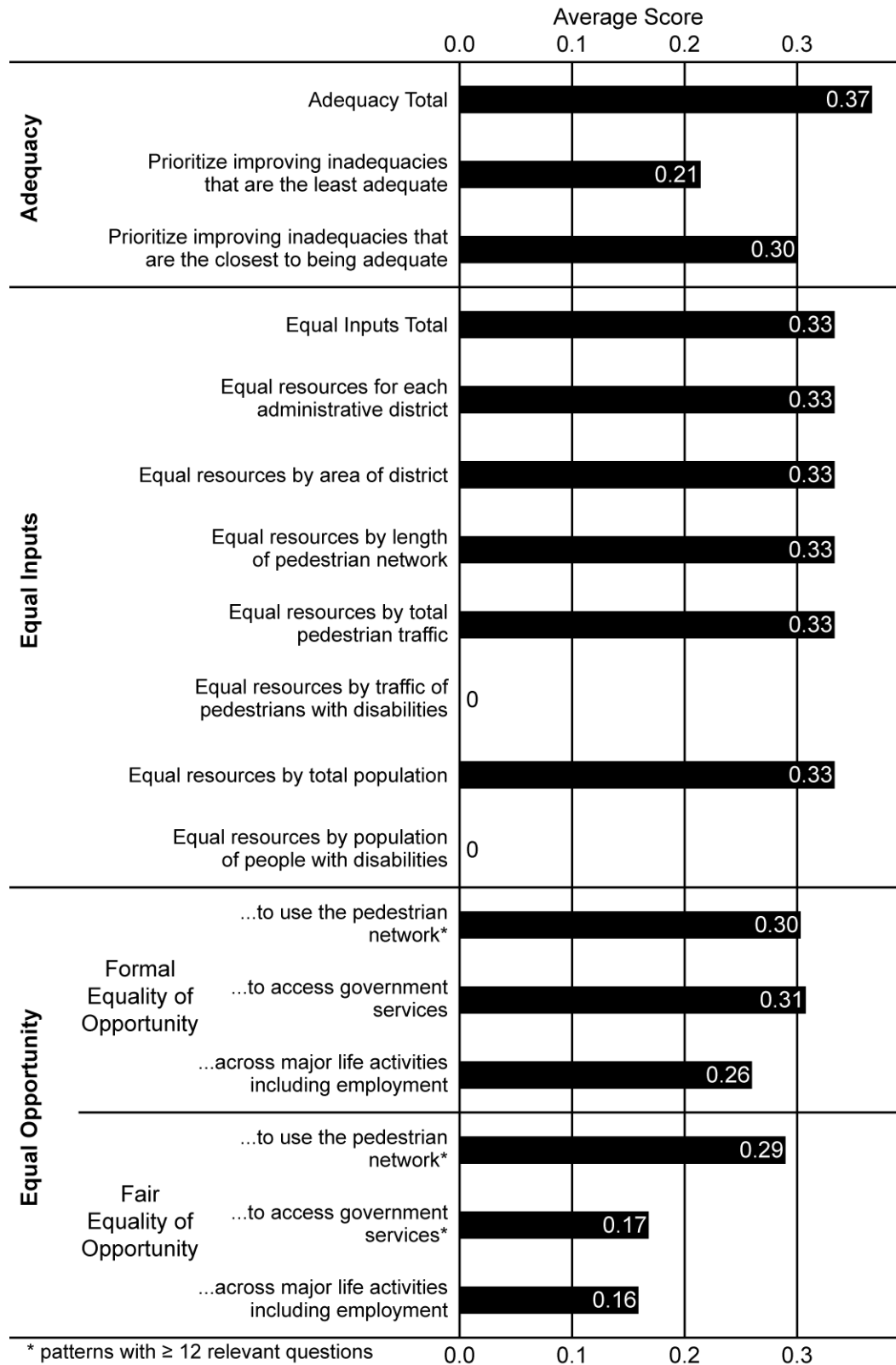


Figure 1. Average Scores by Equity Pattern (Page 2 of 3)

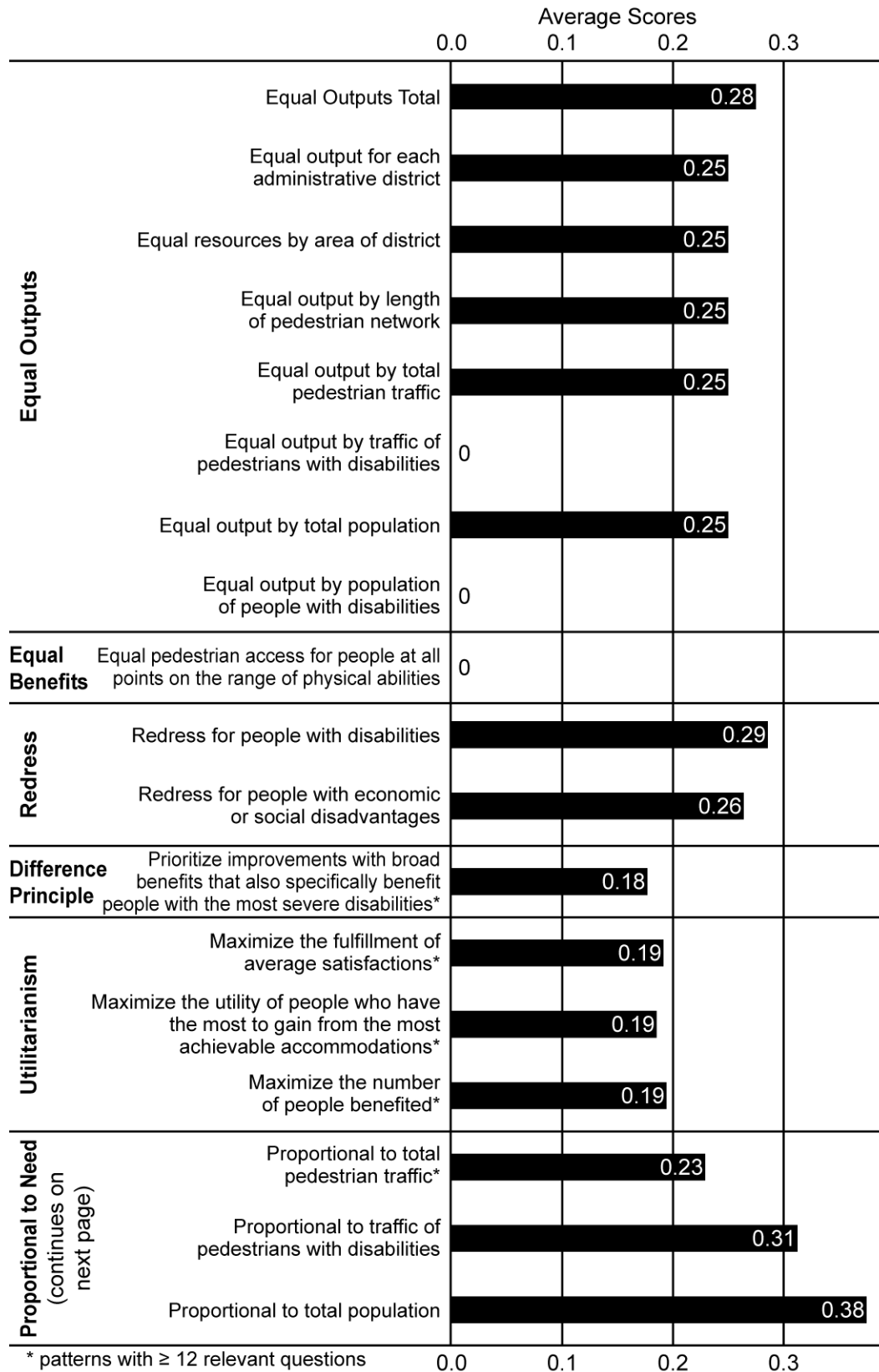
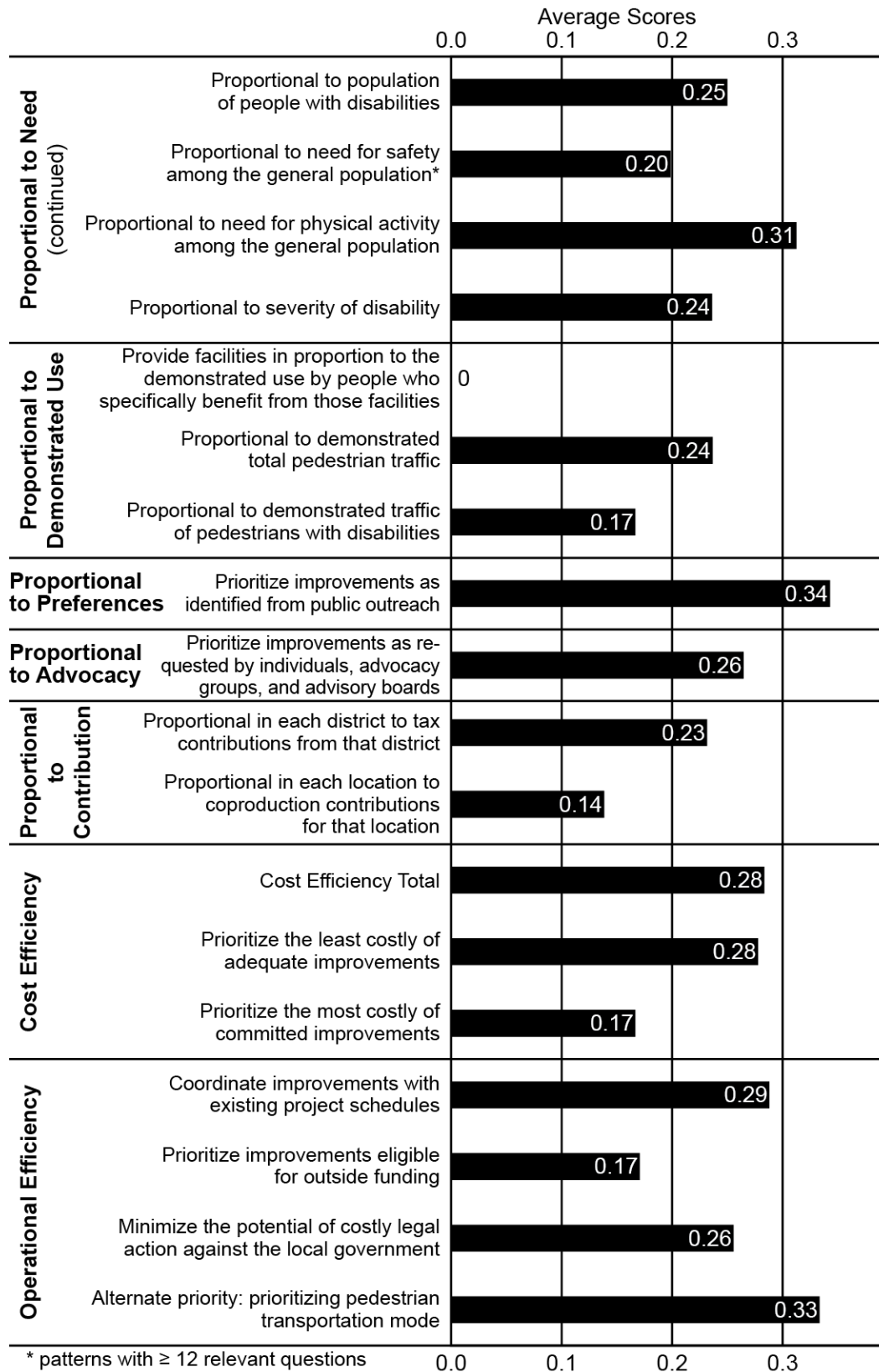


Figure 1. Average Scores by Equity Pattern (Page 3 of 3)



In order to account for a potential bias in the data, scores of zero are ignored when computing the average for some equity patterns. The potential bias is a correlation between the number of questions in the survey relevant to a particular equity pattern and the scores for that equity pattern. Generally, the more questions that were asked about a particular pattern of equity, the more likely it is that respondents' answers showed that pattern. However, the strength and nature of the correlation changes depending on the number of relevant questions. For equity patterns that have fewer than nine relevant questions in the survey, there is a strong correlation between the average of all scores (including scores of zero) and the number of questions. Once nine questions have been asked the correlation dissipates. This issue can be resolved by ignoring scores of zero. When the average is calculated using only non-zero scores, there is weak correlation for patterns with few relevant questions. Using only non-zero scores creates another area of strong correlation, however. Once twelve questions have been asked, there starts to be a correlation between the number of questions and the average of non-zero scores.

When few questions are asked, it is like the survey is a receiver with weak reception. Too many of the respondents' answers are not picked up, so there is a bias toward answers of zero, bringing down the average. We can correct for this by only considering the non-zero answers, that is, the ones that our receiver was able to pick up. Once enough questions are asked, however, the survey's reception is strong enough to pick up all (or close to all) of the respondents' answers. Now answers of zero are less like dropped signals and more like clear

signals of zero. If we drop these zero answers, we are artificially inflating the average, leading to a correlation again. To correct for these trends in the data, I calculated the average score differently depending on the number of questions in the survey that were asked about that equity pattern. For equity patterns with fewer than twelve relevant questions, I treat scores of zero as missing data rather than a real zero; and for equity patterns with twelve or more relevant questions, I treat scores of zero as actual scores of zero. In figure 1, equity patterns with twelve or more relevant questions are marked with asterisks. The average scores for patterns with asterisks were calculated using scores of zero. The other patterns without asterisks have fewer than twelve relevant questions in the survey, and show averages calculated without scores of zero.

Six of the sample applied patterns have average scores of zero. This means that these patterns were not represented in the responses given by the local governments in my sample. These had no non-zero answers. For two of these six patterns (the one sample pattern for the principle of equal benefits and one of the patterns for the principle of proportionality to demonstrated use) the survey did not include questions relevant to these patterns, other than the open-answer questions. The other four, two patterns each from the principles of equal inputs and outputs, did include relevant questions with possible answers that suggested these equity patterns. However, none of the respondents in the survey gave answers consistent with the patterns.

Another way of analyzing the data is to look at the prevalence of different equity patterns, without regard for how strongly the pattern is manifested. Rather

than taking an average score, we can look simply at how many respondents gave at least one answer consistent with each equity pattern. We can also look at how many respondents had a higher level of correspondence with the pattern of equity. In the chart that follows (Figure 2), the white bars show how many respondents gave at least one answer consistent with that type of equity. The black bars show how many respondents had a score of greater than one-third (0.33) for that type of equity. The two stages of the survey produced twenty complete responses, so the number of respondents on the chart is out of 20, the maximum total possible matching responses.

Figure 2. Number of Matching Respondents by Equity Pattern (Page 1 of 3)

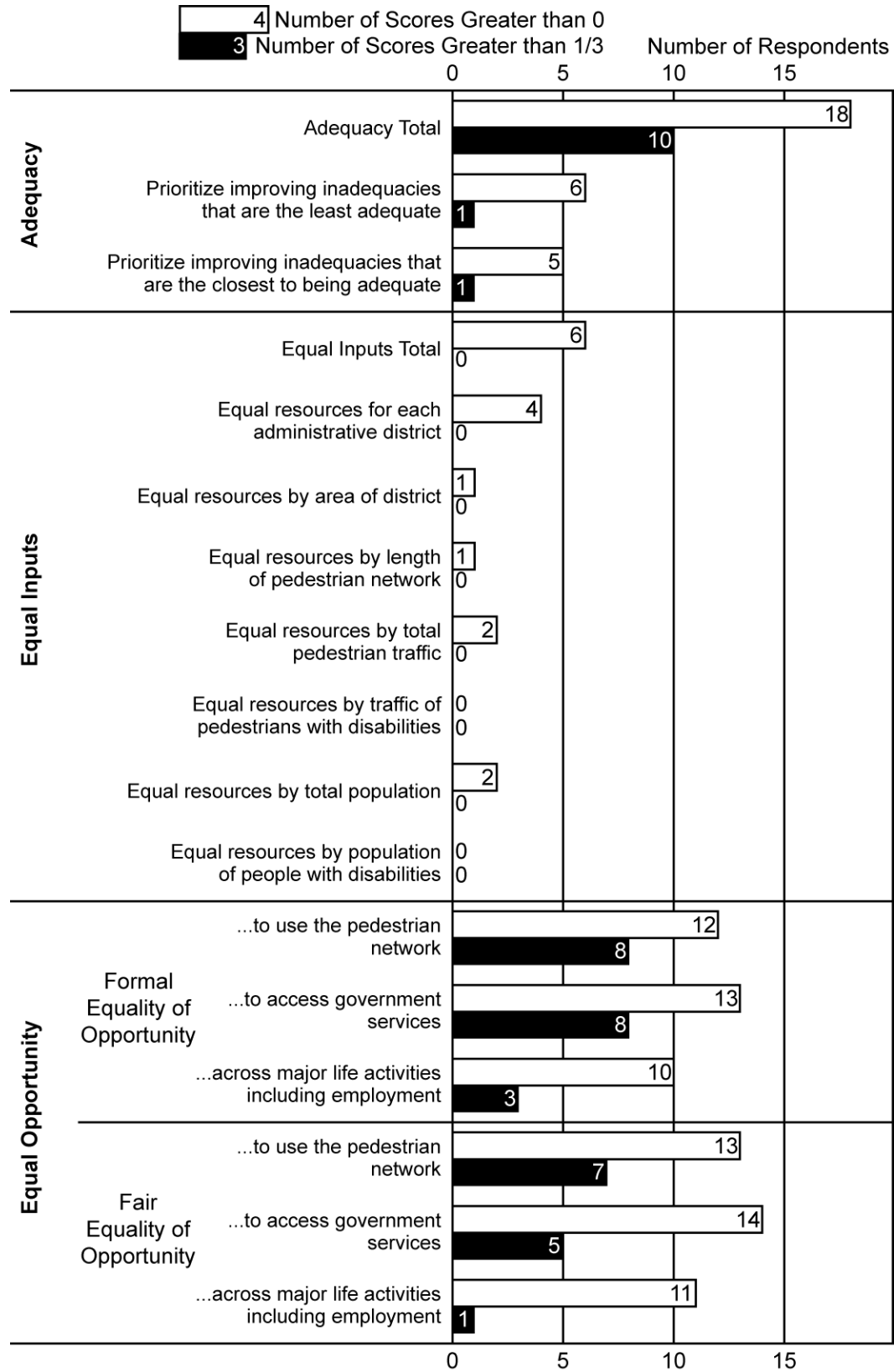


Figure 2. Number of Matching Respondents by Equity Pattern (Page 2 of 3)

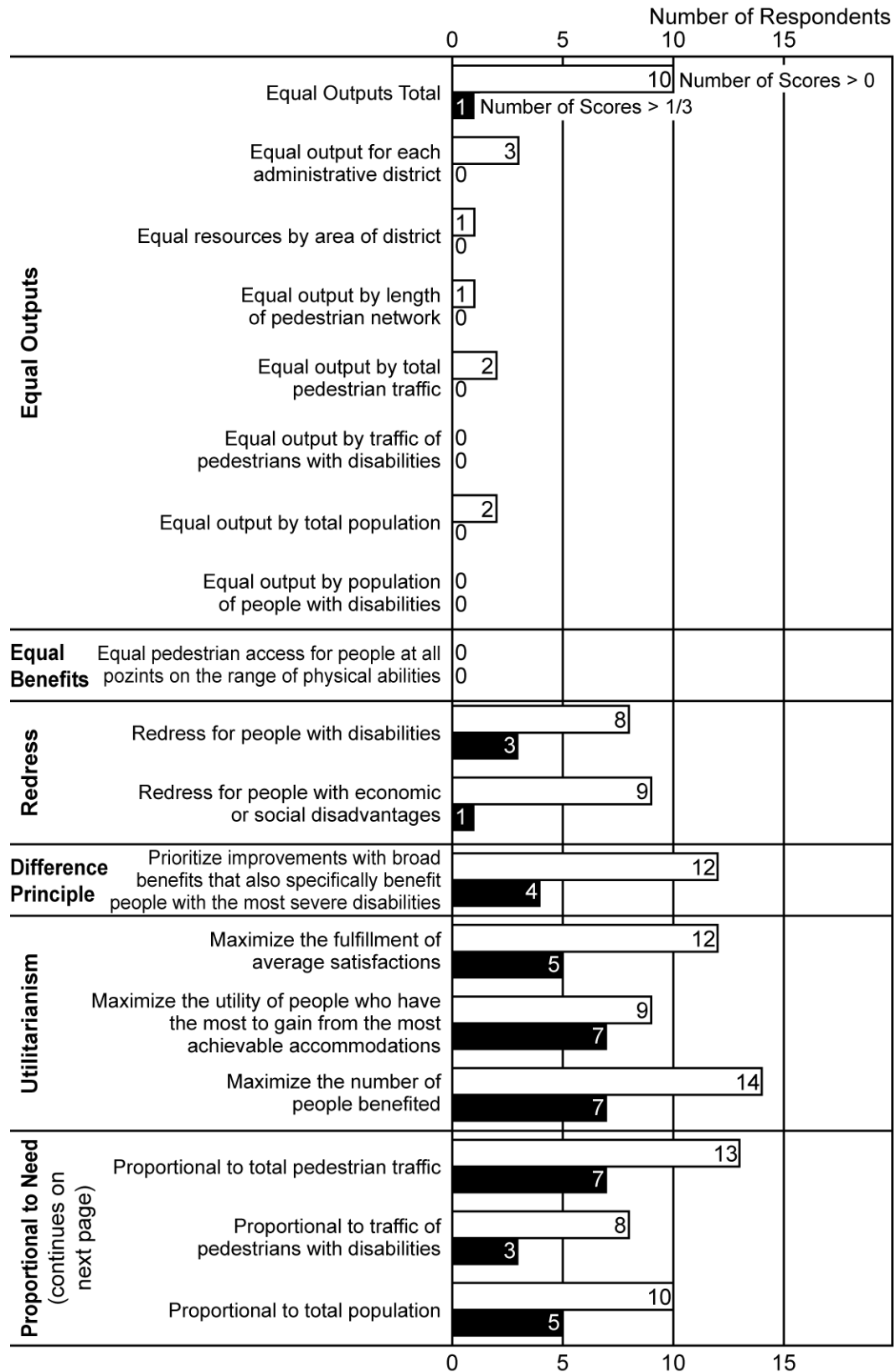
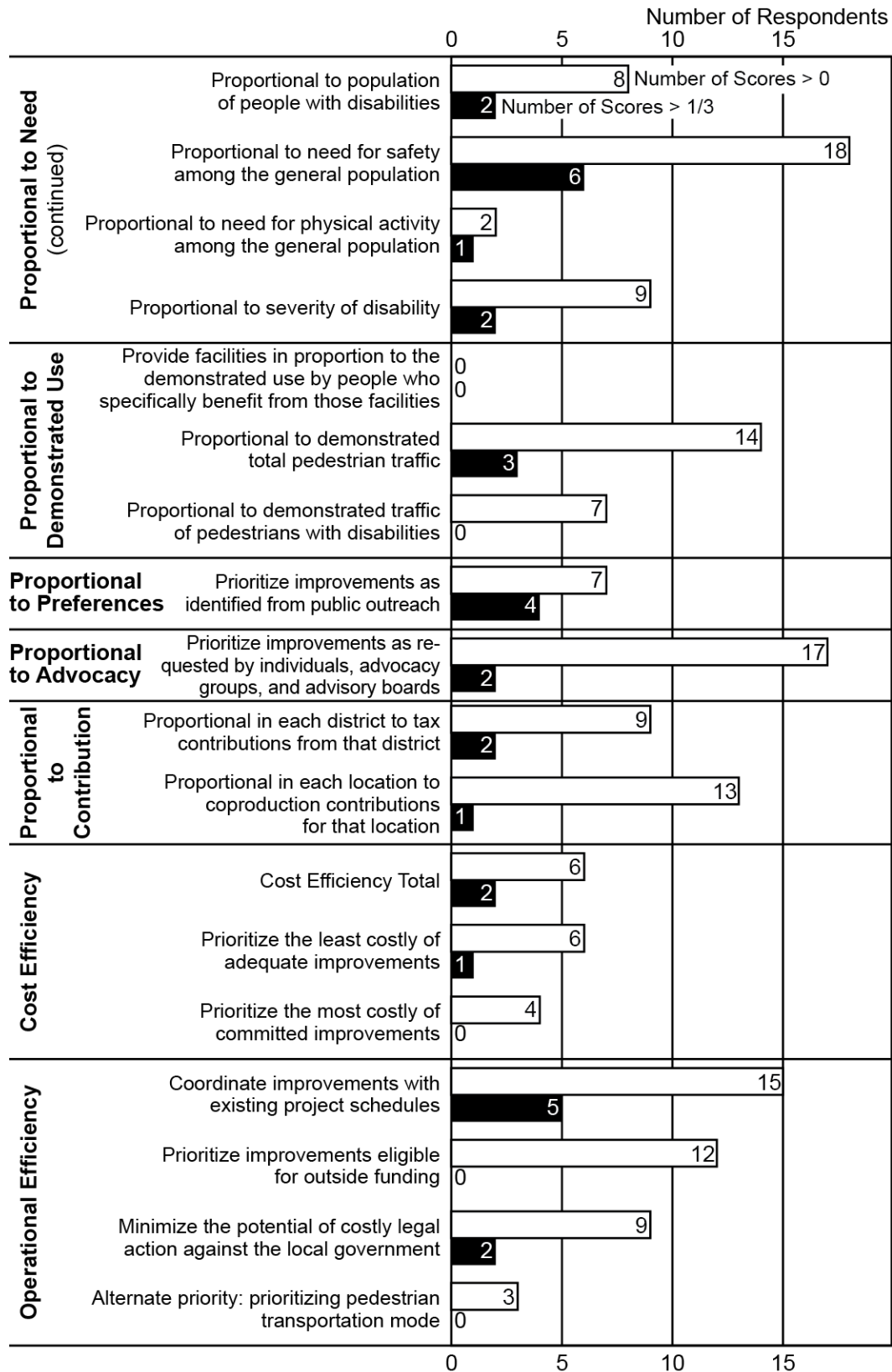


Figure 2. Number of Matching Respondents by Equity Pattern (Page 3 of 3)



Discussion

Local officials are influenced by many different traditions of theory and practice. Each of these traditions contains ideas about fairness and particular conceptions of equity. These different conceptions, in turn, lead to different outcomes when those local officials make decisions. What do the results of my two-stage survey say about the influence of these different traditions on how local officials prioritize improvements for accessible pedestrian rights-of-way?

The survey helps to answer this question in two different ways. The general questions, mostly from the first questionnaire, provide context for local government's prioritization efforts. Answers to these general questions explain the extent of the challenge and generally how much priority is given in general to accessible streets. The second way that the survey helps to answer this question is through the detailed questions from the second questionnaire about which specific locations and facilities are given priority. Answers to the specific questions explain which conceptions of equity are most prevalent and most strongly influence policymakers.

General Priority for Accessible Streets

According to the responses to my survey, making public rights-of-way accessible for people with disabilities is an important issue for many local governments. Of the 24 respondents to the first questionnaire, 23 indicated that providing accessible streets is an active policy and is given some priority by the local government. Only one respondent answered that accessible streets are “not

at all important.” Since this respondent went on to list the actions that his local government is making to improve pedestrian accessibility, including spending roughly five percent of its annual capital budget on pedestrian accessibility, I interpret this response not as saying that accessible streets are an insignificant issue in that jurisdiction, but rather that the respondent feels that local leaders have not recognized its importance.

However, the same results show that accessible streets are not necessarily a top policy priority. Although eight respondents (33 percent) answered that accessible streets are a “top policy priority,” nearly twice that number, fifteen respondents (63 percent), answered that accessible streets are merely “one among many important policies.” My survey was designed to reach the people in each jurisdiction who are most involved with accessible streets and other policies for people with disabilities. We can expect that generally these people would be more committed to providing accessibility and more likely to see it as an important issue than other local officials in their jurisdictions. Given this tendency, it is significant that nearly two-thirds of respondents seem to acknowledge that there are other policies that are given higher priority.

These results show that accessible streets are an issue that cities and counties are thinking about and dealing with. The results also show that this issue is competing with other issues, and not always coming out on top as the most important priority. The results of other general questions support both sides of this general trend: that accessible streets are important but not always the most important issue.

Twenty-one respondents (88 percent) reported that their local government has conducted an evaluation of how accessible its public rights-of-way are, at least for some areas within its jurisdiction. This indicates that a strong majority of cities and counties are attempting to address pedestrian accessibility. The ADA requires local jurisdictions to address the issue, but it is significant that local governments seem to be at least minimally following these requirements. Of the local jurisdictions that have conducted an evaluation, 95 percent of the evaluations were based on accessibility as defined in adopted or proposed ADA Accessibility Guidelines. Again, this demonstrates the influence of the ADA to literally define the issue to address.

The magnitude of the challenge that these cities and counties are facing varies greatly. Responses to the first questionnaire include one jurisdiction where less than ten percent of the public rights-of-way are estimated to be accessible, three jurisdictions where more than seventy-five percent are estimated to be accessible, and several jurisdictions at each of various intermediate levels.

The trend that accessible streets are important, but not necessarily the most important issue, is visible in the budget estimates that respondents provided. The estimated percentage of cities' and counties' capital budgets spent on accessibility improvements varies greatly, from 0.01 percent to more than 64 percent. Within this range, however, the majority of estimates were between 0.5 percent and 6 percent. Both extremes of the range are exceptions, but instructive cases. The jurisdiction that reported spending one hundredth of a percent of its capital improvements budget on accessibility provided one of the most detailed and

rigorous prioritization studies that I came across in this research. The respondent for this local government acknowledged that the committed budget amount is small, but reported that the local government had been successful in the past finding grant funding to cover additional work. The jurisdiction that reported spending 64 percent of its capital budget on accessibility improvements is working under an implementation plan that had been required by a legal settlement. As such, the high percentage does not necessarily represent the local government's commitment to accessibility so much as local advocates' commitment to getting results through the courts.

Without knowing what other priorities there are to compete with, the overall priority for pedestrian accessibility does not give us any indication of which conceptions of equity are being invoked and implemented. However, the general priority establishes that accessible streets are an important issue that local governments are addressing. This means that officials in these local governments are making significant decisions, and that this research can help uncover the conceptions of equity in those decisions. The second general finding, that the general priority for accessible streets is not always at the top, reminds us that resources available for pedestrian accessibility are constrained. Accessibility improvements must compete with other priorities for what limited resources local governments have. It is in situations of scarcity where the prioritization matters the most, and where an investigation of equity can draw the sharpest lines between different equity patterns as they are put into practice.

One further general finding provides relevant background. Sidewalks have complicated ownership. Although the ADA holds the local government ultimately responsible for the accessibility of the pedestrian network, in many cases it is private property owners who actually construct and maintain sidewalks. Thirteen of the twenty respondents to the second questionnaire (65 percent) reported that costs for sidewalk construction, maintenance, and repair are at least partly covered by adjacent property owners, including twelve (60 percent) where the local government also shares some portion of the cost. In some cases, developers are required to install and pay for pedestrian facilities as a part of new developments, which are then turned over to the city for ongoing upkeep and maintenance. In other cases, the city takes responsibility for installing pedestrian facilities during street reconstruction, but leaves maintenance up to property owners. I went into this research with the assumption that cities and counties had the power to make sidewalks accessible or not. The reality is more complicated, and local governments must often negotiate a complex landscape of who is actually building and maintaining pedestrian infrastructure. This complicated situation means that there are more opportunities for different conceptions of equity to come into the process of prioritizing and making decisions.

Prioritization Strategies and Conceptions of Equity

Before analyzing the survey, I hypothesized that the strongest influences would come from the ADA itself, with additional influence from cost considerations and political pressure. Because the philosophy of the ADA is most

akin to equality of opportunity, I expected that most prioritization strategies would emphasize equal opportunity. Likewise, because public management in local government is so often an act of balancing limited resources against the demands of constituents, I expected that the principles of cost efficiency and proportionality to advocacy would also play important roles. The survey results partly support my hypothesis, but also highlight some unexpected equity principles.

As documented in the previous chapter, I analyzed the strength of equity patterns in three ways: average score, number of non-zero scores, and number of scores greater than one third (33 percent). Because scores are given on a range from 0 to 1, the average score can also be thought of as an overall percentage match. The number of non-zero scores shows the total number of respondents' strategies that reflect that particular equity pattern to any degree. The number of scores greater than one third can be thought of as the number of strategies that strongly reflect that particular equity pattern.

Which equity patterns are strongest varies somewhat by how strength is measured, but the principle of adequacy comes out as one of the strongest patterns regardless of the measure. The total for adequacy has the second highest average score (37 percent), is reflected in the strategies of the greatest number of respondents (18), and is strongly reflected (with scores greater than one third) in the greatest number of strategies (10). Adequacy is not a true equity principle, since it does not provide a guide for what should be prioritized when adequacy cannot be maintained everywhere or when adequacy has been achieved

everywhere. Even so, it is a widely invoked principle, and it is a common element in many of the different traditions of theory and practice that influence pedestrian accessibility. As explained in chapter three, traditions that suggest adequacy include pedestrianism, ADA accessibility guidelines, and other technical standards.

Most of the scores for adequacy do not distinguish between the two possible specific patterns of adequacy: whether to prioritize improvements that are the closest to being adequate, or those that are the least adequate. Of the responses where it was possible to assign the strategy to one pattern or the other, the average score for prioritizing the closest to adequate (30 percent) is higher than the average score for prioritizing the least adequate (21 percent). However there does not seem to be a large difference in prevalence between these two patterns of adequacy. Prioritizing the closest to adequate is strongly reflected in one respondent's strategy and reflected at all in four other respondents' strategies. Similarly, prioritizing the least adequate is also strongly reflected in one respondent's strategy and reflected at all in five other respondent's strategies. Both specific patterns of adequacy seem to be represented in local governments' practices, but neither is dominant over the other.

The highest average score, at 38 percent just slightly higher than the total for adequacy, is for the pattern of making improvements in proportion to total population, one of the applied patterns of the principle of proportionality to need. This pattern is reflected in thirteen strategies, including seven where it is strongly reflected. Although other patterns are even more prevalent, prioritizing in

proportion to total population is one of the more commonly reflected patterns. As with adequacy, I did not expect that patterns from the principle of proportionality to need would be so strongly or widely expressed. Making improvements in proportion to total population, which is only indirectly related to the demand for pedestrian infrastructure or demand for accessibility by people with disabilities, suggests that policymakers are following general ideas about fair distributions rather than rethinking fairness for each particular issue.

Aside from adequacy and total population, the strongest patterns include proportionality to preferences (average score 34 percent, 7 non-zero scores, 4 high scores greater than one third) and proportionality to advocacy (average score 26 percent, 17 non-zero scores, 2 high scores). I expected advocacy to play a major role, which is supported by the data. The average score for proportionality to advocacy is not particularly high, and actually less than the average score for preferences, but the prevalence of advocacy-based prioritization strategies is quite high. This indicates that advocacy very often plays some role in local government's strategies, but is not usually a particularly strong influence. In contrast, the average score for proportionality to preference is quite high, and the pattern's prevalence is also wide-spread though not exceptionally so. Recall that the difference between advocacy and preferences is whether someone is openly advocating for a particular policy or whether their preferences only become expressed through outreach by the government. These scores may indicate that advocacy is nearly always an element in the development of a prioritization

strategy, but that directed outreach can have a greater influence on prioritization and distribution equity when it is used.

Two other patterns bear mention with the highest scoring patterns. The prevalence of proportionality to need for physical activity, reflected in eighteen respondents' strategies, is tied with adequacy for the most widespread, and also shows a high average score (31 percent) and is strongly reflected in a moderate number of respondents' strategies (6). Proportionality to need for physical activity is an expression of the emphasis on sidewalks as a tool for public health. The high average score and the wide prevalence of this pattern demonstrates the influence of public health goals in the prioritization of sidewalk accessibility. Meanwhile, coordinating with existing project schedules, one of the applied patterns of the principle of operational efficiency, has a moderately high average score (29 percent) but stands out more for being reflected to some degree in a high number of respondents' strategies (15). The strong showing for this pattern shows the importance of operational efficiency for government projects in general.

Although I expected equality of opportunity to be among the most strongly represented principles, its applied patterns were not among the top scores. Even so, the average scores and prevalence are moderately high for three of the patterns of equal opportunity: formal equality of opportunity to use the pedestrian network (average score 30 percent, 12 non-zero scores, 8 high scores greater than one third), formal equality of opportunity to access government services (average score 31 percent, 13 non-zero scores, 8 high scores), and fair equality of opportunity to use the pedestrian network (average score 29 percent, 13 non-zero

scores, 7 high scores). While not the strongest numbers, these do represent strong influence from these patterns of the principle of equal opportunity.

For each opportunity (to use the pedestrian network, access government services, or achieve major life activities), the average score and the number of high scores (that is, scores greater than one third) is higher for formal equality of opportunity than for fair equality of opportunity. Conversely, for each opportunity, fair equality of opportunity is reflected in one more respondent's strategy than is formal equality of opportunity, although this is not a large difference. Within each type of equality of opportunity (fair or formal), the narrower opportunities, namely the opportunities to use the pedestrian network or access government services, have higher average scores and are reflected in more respondents' strategies than more the general opportunities such as access to employment. Together, these results show that formal equality of opportunity and narrowly defined opportunities are the most strongly represented versions of equal opportunity. This shows the influence of ADA enforcement, where the focus is more narrowly on the pedestrian network and government services. Moreover, the checklist aspect of ADA compliance encourages thinking in terms of formal equality of opportunity.

After equal opportunity and advocacy, I expected the strongest influence from the principle of cost efficiency. Although the total for cost efficiency has an average score on the high end (28 percent), patterns of cost efficiency are reflected in only six respondents' strategies and strongly reflected in a mere two of these. It is surprising that cost efficiency is not more prevalent. However, the

principle's moderate average score despite the low prevalence indicates that cost efficiency is given moderate importance at least by local governments that include it as a factor. For an example of a local government putting importance on cost efficiency, one respondent whose jurisdiction scored a 20 percent match with the principle of cost efficiency reported that the highest priority objective of their efforts for accessibility in the pedestrian network is "leveraging investments to maximize the accessibility of our system." Making use of ("leveraging") limited inputs ("investments") so as to maximize a particular outcome is a clear expression of what Litchfield (1971, 161) calls the "efficiency criterion."

Within the specific patterns of cost efficiency, prioritizing the least costly of adequate improvements is more strongly expressed and more prevalent than prioritizing the most costly of committed improvements. Prioritizing the least costly has an average score of 28 and is reflected in six respondents' strategies, including one high score greater than one third. In contrast, prioritizing the most costly is only present in four respondents' strategies. In each of these four cases of a match with prioritizing the most costly, the respondent gave only one of the six possible answers consistent with this pattern, putting the average score, not counting scores of zero, at one sixth (17 percent). The stronger showing for prioritizing the least costly improvements reflects the conventional understanding that costs fall over time. Although there is theoretical support, described in chapter two, that local governments may actually be facing rising costs over time and so should prioritize the most costly of committed improvements, it seems that this idea is not well supported in local governments' actual practices.

In addition to highlighting the strongest equity patterns, the survey results also show which patterns were weakly expressed and least prevalent. Some of the lowest average scores are for patterns of equal inputs and equal outputs. This indicates that local governments do tend to prioritize certain facilities and certain locations over others, rather than try to spread resources equally. Even in jurisdictions with strategies that do seem to match the principles of equal inputs or equal outputs, the match may be a coincidence and not truly reflect endorsement of these principles. The respondent for one local government explained that its strategy ranks projects by priority, but groups those ranked projects “within districts to reduce mobilization costs.” This answer shows that what appears to be an implementation of the principle of equal inputs may in fact be an implementation of the principle of operational efficiency.

Among patterns of equal inputs and equal outputs, the greatest number of non-zero scores is for the total of equal outputs, which is reflected in ten respondents’ strategies. All ten of these respondents were recorded as reflecting a pattern of equal outputs because they reported that their jurisdictions use some measure of output or progress. (Some of these also gave other answers consistent with equal outputs.) Overall, half of the local governments in my survey sample do track program outputs or progress toward goals. As for the specific measures, ten jurisdictions monitor progress by the number of improvements made, six by the length of the accessible pedestrian network, and five by the number of citizen requests met. Each of these three measures is an example of measuring outputs, rather than outcomes. Although measuring outcomes may better reflect the real

purpose of government programs, including public works projects in the public right-of-way, outputs are easier to measure and track. Reducing pedestrian accidents is an example of an outcome, and seven jurisdictions reported tracking the number of pedestrian accidents. Despite this moderately high number for measuring accidents, measures of outcome seem to be less frequently used than measures of outputs. Only two responding jurisdictions reported tracking the number of people with disabilities participating in government services or programs, for example.

Two of the patterns related to efficiency are considerably more weakly represented than I expected. Making improvements in proportion to coproduction has an average score of 14 percent and is only strongly reflected in one respondent's strategy. Similarly, prioritizing improvements eligible for outside funding has an average score of 17 and is not strongly reflected in any respondents' strategies. Both are reflected to some degree in a moderately high number of strategies, however. For coproduction, most of these matches are because the respondent reported that sidewalk construction or maintenance in the jurisdiction is at least partly paid for by adjacent property owners. Where property owners either have the full responsibility or a share of the responsibility, this is in effect prioritizing improvements in areas where abutting private property owners are able and willing to contribute their resources toward improving the sidewalk. Other examples of coproduction seem to be rarer or less recognized by local officials. Together, the low scores but moderately high prevalence for both these patterns indicate that access to outside funding, whether from local property

owners or federal grants, is a common factor in local governments' prioritization strategies but has less influence on distributional outcomes than other principles.

Applied patterns of the difference principle and utilitarianism are not strongly reflected in the survey results. Neither are they the weakest patterns, however. These are solidly in the middle. The representative pattern for the difference principle has an average score of 18 percent and is reflected in twelve respondents' strategies, including four strategies where it is strongly reflected. These numbers are similar to the numbers for the various patterns of utilitarianism, all of which have an average score rounded to 19 percent and are strongly reflected in at least five respondents' strategies each. The difference principle and utilitarianism are complex, involving fine distinctions between different distributions, and are identified more with theoretical philosophers than practical implementation. Despite the more theoretical nature of these principles, the moderate scores for their representative patterns indicate that they are real patterns that are put in practice.

Comparing scores for related patterns can also reveal significant results. Among possible prioritization strategies, some use prioritization criteria based on facts of the general population while others focus directly on people with disabilities. For example, patterns that prioritize in proportion to pedestrian traffic can give priority in proportion to traffic of all pedestrians or instead can give priority in proportion to traffic of only those pedestrians who have disabilities of some kind. Focusing on people with disabilities is closely related to the goal of making the pedestrian network accessible for them, but facts about the general population are

much easier to measure and estimate. In addition, using facts about the general population can be seen as fairer since it does not focus on any one group of people. This view is expressed by one respondent who answered the highest priority objective of her jurisdiction's efforts for accessibility in the pedestrian network is "providing safe access in areas of highest demand by all populations."

In the survey results, patterns that look at the general population tend to be more strongly expressed than corresponding patterns that focus directly on people with disabilities. These pairs of patterns include equal inputs by traffic, equal inputs by population, equal outputs by traffic, equal outputs by population, proportionality to population, and proportionality to demonstrated traffic. In these pairs, the pattern that looks at the whole population has a higher average score, is present in more respondents' strategies, and is strongly reflected in more respondents' strategies. As noted above, making improvements in proportion to total population is one of the strongest patterns overall in the survey results. The exception to the trend is the pair for proportionality to traffic, which together are two of the applied patterns of the principle of proportionality to need. Although the pattern of prioritizing in proportion to total pedestrian traffic is reflected in more respondents' strategies (13 compared to 8) and strongly reflected in more respondents' strategies (7 compared to 3) than is the pattern of prioritizing in proportion to traffic of pedestrians with disabilities, the higher average score is claimed by the latter pattern (31 percent compared to 23 percent). This may be a result of the way that averages are computed. Proportionality to total pedestrian traffic has eighteen relevant questions, so scores of zero are included in

calculating its average score. Proportionality to traffic of pedestrians with disabilities has only seven relevant questions, so its average ignores scores of zero. If the average were calculated the same way for both patterns, either counting zeros or not, then proportionality to total pedestrian traffic would have the higher score in either case. As explained in the previous chapter, using two methods to calculate averages is necessary to account for a potential bias in the data, but the result of calculating the averages the same way indicates that this pair is likely not a meaningful deviation from the trend in the other pairs, and may not actually be an exception at all. Overall, the trend suggests that even in the case of improvements to accessibility for people with disabilities, policymakers think in terms of the needs of the general population rather than the needs of specific groups.

Different patterns do not necessarily exclude one another. In fact, some groups of patterns reinforce each other. One example is proportionality to advocacy. When local officials make it a point to listen to advisory groups and advocates, it matters what equity principles those groups and advocates have in mind. The jurisdiction with the highest score for the pattern of proportionality to advocacy (78 percent, compared to the next highest at 56 percent) also has the highest scores for equality of opportunity to use the pedestrian network, both as formal equality of opportunity (88 percent) and fair equality of opportunity (82 percent). That jurisdiction's responses to open-answer questions also show the importance of advisory groups. The highest priority objective of the jurisdiction's efforts for accessibility in the pedestrian network is listed as "compliance with

ADA as per persistent citizen advocacy.” In addition, the jurisdiction’s prioritization is based on a decision matrix developed by a task force that includes “advocates for blind and visual impairments and mobility impairments, ...commissioners [appointed by the mayor to an advisory council for people with disabilities], [and] other interested persons.” In this jurisdiction, at least, it seems that advocates value the principle of equal opportunity, possibly because they are influenced by the sociopolitical model of disability.

The jurisdiction with the second highest score for the pattern of proportionality to advocacy (56 percent) lists “requests/complaints from the general public & local politicians” first among factors for prioritization. This jurisdiction also has the highest score for proportionality to demonstrated total pedestrian traffic (63 percent) and proportionality to need for safety (47 percent). This second jurisdiction shared with the first an emphasis on responding to requests and advocacy, but it seems that their advocates are asking for slightly different things.

Before analyzing the survey, I expected that most of the ethical implications would be implicit. I did not expect to find many strategies that had been specifically chosen because of an explicit commitment to an idea of distributive justice. In analyzing the results, however, a surprising number of strategies were established through formal prioritization matrices or other formalized policies that explicitly reference equity principles. One respondent’s short response to question 7 on the first questionnaire, for example, lays out the

principles as well as the operation criteria to implement those principles. The respondent writes:

“Prioritization is based on many factors including:

1. Need - based on requests/complaints from the general public & local politicians
2. Benefits - how many will benefit from the improvements
3. Improved Safety - Will the project reduce hazards /potential accidents
4. Funding - Can we afford the project or will it qualify for state/federal funding”

To avoid overstating the case, I must acknowledge that most of the survey responses did not include so direct an invocation of equity principles. However, it is remarkable and significant that the ethical implications were identified at all by any respondents. Not only is the survey short with few open-answer questions, it also talks generally about “prioritization” and “accessibility” without making any mention that the research project is interested in equity and distributional justice. It seems that local officials, or at least the ones I reached with my survey, do often pay mind to the equity implications of their decisions.

Overall, the principle of adequacy is the most strongly expressed and most widely represented conception of equity in the survey results. Making improvements in proportion to the total population of the surrounding neighborhood, responding to advocacy, and accommodating preferences identified from public outreach are also strongly represented in the results. Although still well represented, the principles of equal opportunity and cost efficiency seem to be less influential than expected.

Conclusion

Ultimately, the effort to provide accessible public rights-of-way must be about the people who use the sidewalk. Local officials may think of them as constituents, traffic engineers may think of them as pedestrians, and residents may think of them as neighbors or friends. However we think of people who use the sidewalk, the fact remains that they represent the same vast range of human diversity that people always exhibit. This diversity includes a great range of physical and mental impairments and disabilities that affect our ability to access, travel on, and enjoy the benefits of the public pedestrian network.

Efforts for pedestrian accessibility must acknowledge this diversity and seek to advance people's ability to "live in the world" as tenBroek (1966) describes it. In the context of public rights-of-way for pedestrians, any reasonable conception of equity must have the goal of ensuring and expanding, in one way or another, the right to live in the world. There are many ways to achieve this goal, and many conceptions of equity that point the way. It is not the purpose of this research to recommend one conception of equity over another. There are deep traditions of theory and practice that back up the many different conceptions of equity, and each conception has its merits in different contexts.

Local officials, whether elected officials or government employees, must make choices with equity implications. It is precisely because there are so many valid conceptions of equity, reinforced by diverse and overlapping traditions, that these decisions are important. Because there is no one "right answer" and because each answer is necessarily dependent on the context of the question, sound

decision-making requires careful attention to the equity implications of every decision.

Decisions about the distribution of resources are best when the equity considerations are put in the open. This is equally true for decisions about prioritizing improvements to make public rights-of-way accessible for people with disabilities. I hope that this thesis can play some small role by helping to bring the equity implications of these decisions into the open. The taxonomy of equity patterns as well as the questions in the survey questionnaires may help by providing a vocabulary and way of thinking about the many kinds of equity in the pedestrian network. Through open acknowledgement of the equity implications, cities and counties can continue toward the goal of upholding all people's right to live in the world.

First Questionnaire

Accessible Streets

My name is Gabriel Holbrow, I am a master's student in Urban and Environmental Policy and Planning (UEP) at Tufts University. I am conducting thesis research on the challenges that local governments face in providing accessible streets and sidewalks, particularly for people with disabilities. I am sending this survey to representatives of municipalities and counties through the United States.

In this survey, the questions are numbered 1 through 10. Questions 4 and 5 have follow-up sub-questions. Depending on your answers, you may be asked between three and fourteen total questions. The entire survey should take less than 15 minutes to complete.

Data from this survey will be disclosed in aggregate form. No specific responses will be published without your specific consent.

Please call or email if you have any questions or concerns.

Researcher:

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Phone: (617) 627-3394

Fax: (617) 627-3377

Street Address: 97 Talbot Avenue, Medford, MA 02155

Your responses will be helpful for my research, and I hope useful for other local governments dealing with the same issues. Thank you.

1. Which city do you work for?

2. Is your local government responsible for constructing and/or maintaining streets and/or sidewalks?

No. *(Skip to question 10 on page 4.)*

Yes. *(Continue to question 3 below.)*

- 3. Given budget restraints and competing priorities, how important is it to your local government that its streets and sidewalks (public rights-of-way) be accessible to people with disabilities?**

Not at all important.

A worthy goal, but not a priority.

One among many important policies.

A top policy priority.

- 4. Has your local government ever undertaken a study or evaluation of how accessible its public rights-of-way are?**

No. *(Skip to question 5.)*

Yes, for certain areas. *(Continue to question 4(a).)*

Yes, across all public rights-of-way in its jurisdiction. *(Continue to 4(a).)*

I do not know. *(Skip to question 5.)*

Sub-questions 4(a) and 4(b) ask about ADA Accessibility Guidelines (ADAAG), one of the implementing instruments of the Americans with Disabilities Act (ADA).

Information on ADAAG: <http://www.access-board.gov/ada/>

Information on Guidelines for Public Rights-of-Way, a proposed supplement to ADAAG: <http://www.access-board.gov/prowac/>

- 4(a). Did any study undertaken by your local government evaluate the accessibility of its public rights-of-way based on any version of ADAAG or the proposed Guidelines for Public Rights-of-Way?**

No.

Yes.

I do not know.

- 4(b). Based on the most recent study, approximately what percentage of the total mileage of your public rights-of-way would qualify today as “accessible routes” under ADAAG?**

Less than 10%

10-30%

30-50%

50-75%

More than 75%

I do not know. / The study does not help answer this question.

5. Has your local government ever had an implementation plan for providing accessible public rights-of-way?

No. *(Skip to question 6 on the next page.)*

Yes. *(Continue to question 5(a).)*

I do not know. *(Skip to question 6 on the next page.)*

5(a). What were the origins of the implementation plan(s)?

Please check all that apply.

Included as part of an ADA Transition Plan.

Requested by the Department of Justice or other regulatory authority.

Requested by an advocacy organization or political group.

Required by a legal settlement.

Ordered by a court.

Self-initiated.

Other:

5(b). Does your local government currently follow an implementation plan for providing accessible public rights-of-way?

No.

Yes.

6. What capital improvements does your local government make in order to improve the accessibility of its public rights-of-way?

7. How does your local government prioritize among accessibility improvements?

Which are considered the most urgent? Are some locations given higher priority? Which are left to later years?

8. In the fiscal year that ended most recently, how much did your local government spend on improving the accessibility of its public rights-of-way?
9. For comparison, what was the size of your local government's total capital budget in that year?
10. May I contact you if I have any questions about your responses to this survey?
- Yes.
- No.

Your Name

Title

Department

Work Phone

Work Email Address

Work Mailing Address

Thank you for your time.

Please call or email me if you have any questions or concerns, or if you would like to see results of this survey.

Appendix B

Second Questionnaire

The second survey was sent out in two different versions: one for cities and one for counties. The only difference was that mentions of “your city” and similar phrases in the first are changed to “your county” and similar in the second. What follows is the version for cities. To preserve the page numbering and page breaks in the survey as it was sent out, I have retained the original formatting in the copy of the survey that follows.

Prioritizing the Accessible Pedestrian Network

Thank you for your helpful answers to my survey about the challenges that local governments face in providing accessible streets and sidewalks.

I would like to know more about which accessibility projects are given priority in your city. The following questions ask about your city government's **current practices** when implementing improvements to the accessibility of pedestrian rights-of-way in its jurisdiction, whether or not those practices are based on a formal implementation plan. If some or all sidewalk construction and maintenance in your jurisdiction is the responsibility of individual property owners, please include the effects of the City's enforcement practices in your answers.

The questions are numbered 1 through 8, some with one or two follow-up sub-questions. Depending on your answers, you may be asked between 8 and 15 total questions. The entire survey should take between 15 and 20 minutes to complete. As with the previous survey, no specific responses will be published without your consent.

Please call or email if you have any questions or concerns.

Researcher:

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Email: gabriel.holbrow@tufts.edu

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Faculty Advisor:

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Phone: (617) 627-3394

Fax: (617) 627-3377

Street Address: 97 Talbot Avenue, Medford, MA 02155

Thank you.

1. Which city do you work for?

2. In normal circumstances, who pays for sidewalk construction, maintenance, and repair in your city?

Adjacent property owners.

City government.

Costs are shared between property owners and the government.

Other: _____

3. When improving the accessibility of its pedestrian rights-of-way, does the City try to spend resources equally across areas of the city according to some criteria?

Yes. *Continue to questions 3(a) and 3(b) below.*

No, the City targets priority areas. *Skip to question 4 on page 3.*

No, this has not been considered. *Skip to question 4 on page 3.*

I do not know. *Skip to question 4 on page 3.*

3(a). By what criteria does the City try to equalize the resources it spends?

Check all that apply.

Only answer if you choose "Yes" to question 3 above. Otherwise skip to question 4 on page 3.

By administrative or electoral district

(e.g. all city councilor districts get the same equal amount of resources)

By area

(e.g. a one-square-mile neighborhood gets twice as many resources as a half-square mile neighborhood)

By length of the street network

(e.g. a one-mile street gets twice as many resources as a half-mile street)

By length of the existing pedestrian network

(e.g. a one-mile street with sidewalks on both sides gets four times as many resources as a half-mile off-street path)

By rate of total pedestrian traffic

(e.g. a route with 100 daily passings gets twice as many resources as a route with 50 daily passings)

By rate of pedestrian traffic by people with disabilities

(e.g. a route with 10 daily passings by pedestrians with disabilities gets twice as many resources as a route with 5 daily passings by pedestrians with disabilities)

By total population

(e.g. a neighborhood of 10,000 residents gets twice as many resources as a neighborhood of 5,000 residents)

By population of people with disabilities

(e.g. a neighborhood with 1,000 residents with disabilities gets twice as many resources as a neighborhood with 500 residents with disabilities)

Other: _____

3(b). For the equalization strategies that you checked in 3(a) above, how does the City measure the resources it spends?

Check all that apply.

Only answer if you choose "Yes" to question 3 above. Otherwise skip to question 4 on page 3.

Dollars spent

Staff time

Number of improvements

Other: _____

4. Do your City's practices prioritize based on location?

Yes. *Continue to question 4(a) below.*

No, all locations in the jurisdiction have equal priority. *Skip to question 5 on page 7.*

No, this has not been considered. *Skip to question 5 on page 7.*

I do not know. *Skip to question 5 on page 7.*

4(a). What locations receive priority attention?

There can be more than one first level priority, of course. If there are multiple types of locations (in same or different categories) with equal or roughly equal priority, please check the same box for all.

Only answer if you choose "Yes" to question 4 above. Otherwise skip to question 5 on page 7.

	First Level Priority	Second Level Priority	Third or Lower Lever Priority	Not a Priority	Not Considered
Proximity to Pedestrian Destinations ("Attractors" / "Pedestrian Generators")					
Near government buildings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near medical facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near schools	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near other places of public accommodation (e.g. parks, churches)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near public housing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near accessible housing or residential facilities for people with disabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near public transit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near public parking garages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near major employers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near retail areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near tourist areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Near other destinations: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please give an example of how proximity is defined or measured:

4(a) continued

	First Level Priority	Second Level Priority	Third or Lower Lever Priority	Not a Priority	Not Considered
Neighborhood Character					
Areas with high residential population density	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Areas with high residential density of people with disabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Downtown / Commercial centers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Socially or economically disadvantaged residential districts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Higher-rent residential districts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Areas with the fewest existing pedestrian facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Areas with the most existing pedestrian facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hillier terrain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Less hilly terrain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other neighborhood character: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locations Based on Existing Project Schedule					
Neighborhoods otherwise with priority for revitalization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Corridors otherwise with priority for pedestrian improvements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Corridors otherwise with priority for street reconstruction or maintenance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locations based on other criteria not related to accessibility:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4(a) continued

	First Level Priority	Second Level Priority	Third or Lower Lever Priority	Not a Priority	Not Considered
Pedestrian Traffic					
Routes heavily traveled by pedestrians in general	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Routes heavily traveled by pedestrians with disabilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Routes where people with disabilities make up the smallest proportion of pedestrians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Routes where people with disabilities make up the largest proportion of pedestrians	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locations based on other measure of pedestrian traffic: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safety					
Locations with the most pedestrian accidents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locations with the fewest pedestrian accidents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Streets classified as pedestrian-friendly type	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locations based on other measure of of pedestrian safety: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public Input					
Locations identified in citizen requests or complaints	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locations identified from public outreach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locations identified by an advisory board or committee	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4(a) continued

	First Level Priority	Second Level Priority	Third or Lower Lever Priority	Not a Priority	Not Considered
Locations as required by a court, local access board, or federal agency with enforcement powers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locations based on other method of public input: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost					
Areas with greater design challenges (e.g. narrow right-of-way, hills)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Areas with fewer design challenges	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locations with available outside funding (e.g. grants, private development)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Locations based on other measure of cost: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ownership					
Pathways under private control or ownership (e.g. driveways, privately maintained sidewalks)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pathways on public property	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New developments (public or private)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other locations based on ownership: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4(a) continued

	First Level Priority	Second Level Priority	Third or Lower Lever Priority	Not a Priority	Not Considered
Other					
Other locations: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Feel free to clarify any of your answers to 4(a), if necessary:

5. Do your City's practices prioritize among specific improvements that provide accessibility?

(e.g. sidewalk width versus audible pedestrian signals)

Yes. *Continue to questions 5(a) and 5(b) below.*

No, all specific improvement have equal priority. *Skip to question 6 on page 13.*

No, this has not been considered. *Skip to question 6 on page 13.*

I do not know. *Skip to question 6 on page 13.*

5(a). Generally, what types of improvements get priority?

Check all that apply.

Only answer if you choose "Yes" to question 5 above. Otherwise skip to question 6 on page 13.

Need

Improvements that remove or alleviate barriers faced by the greatest number of people

Improvements that remove or alleviate the most severe barriers to access

Improvements to existing facilities that are the farthest from meeting ADA Accessibility Guidelines

Improvements to existing facilities that are the closest to meeting ADA Accessibility Guidelines

Public Input

Improvements requested by citizens or citizen groups

Improvements identified from public outreach

Improvements identified by an advisory board or committee

Cost

Most expensive improvements

Least expensive improvements

Improvements eligible for outside funding

Other

Other: _____

5(b). What specific improvements get priority?

There can be more than one first level priority, of course. If there are multiple specific improvements (in the same or different categories) with equal or roughly equal priority, please check the same box for all.

Only answer if you choose "Yes" to question 5 on the previous page. Otherwise skip to question 6.

	First Level Priority	Second Level Priority	Third or Lower Lever Priority	Not a Priority	Not Considered
Pedestrian Pathway (Pedestrian Access Route in the Pedestrian Circulation Path)					
Having a pedestrian circulation path	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minimal running slope of path	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minimal cross slope of path	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Greater path width	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Path clear of fixed obstructions (e.g. utility poles, benches)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prompt removal of temporary obstructions (e.g. trash, snow)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smooth path surface material	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Path surface material with traction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minimal vertical surface discontinuities in the path (e.g. breaks, heaves)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minimal openings in the path (e.g. holes, gratings)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Driveway crossings that do not interfere with the pedestrian accessible route	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other improvement in the pedestrian pathway:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5(b) continued

	First Level Priority	Second Level Priority	Third or Lower Lever Priority	Not a Priority	Not Considered
Curb Ramps					
Having a curb ramp at all street crossings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Turning space at top of curb ramp	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clear space at bottom of curb ramp	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minimal running slope of curb ramp	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minimal cross slope of curb ramp	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Greater curb ramp width	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Curb ramp flared sides	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smooth transition between the curb ramp and the road surface	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other curb ramp improvement: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drainage					
Drainage to avoid pooling of water or ice in the pedestrian pathway	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other drainage improvement: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Boundary of the Pedestrian Pathway					
Detectable warning surfaces (DWS) at flush boundaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clearly defined route edges (detectable by cane, foot, or wheel)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5(b) continued

	First Level Priority	Second Level Priority	Third or Lower Lever Priority	Not a Priority	Not Considered
Visual and texture contrast at boundary (e.g. planted borders)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other improvement to the boundary of pedestrian pathway: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Street Crossings					
Designated street crossings (e.g. crosswalk striping)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Signalized pedestrian crossings with Audible Pedestrian Signals (APS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Signalized pedestrian crossings (without APS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced distance to cross the road (e.g. bump-outs, refuge islands)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other improvement at street crossings: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessible Parking					
Accessible parking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessible passenger loading zones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other improvement for accessible parking: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Street Furniture					
Drinking fountains	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Accessible public toilets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Benches or tables	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5(b) continued

	First Level Priority	Second Level Priority	Third or Lower Lever Priority	Not a Priority	Not Considered
Handrails	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shelters and loading areas for street transit (e.g. bus, BRT, light rail)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other street furniture improvement:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<hr/>					
Wayfinding					
Clearly marked and identified accessible routes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Signs directing pedestrians to accessible entrances	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Signs pointing toward major destinations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fixed signs with area maps or directories	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other wayfinding improvement:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<hr/>					
Steep Pathways or Vertical Level Changes					
Ramps	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public elevators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other improvement for vertical level changes:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<hr/>					
Other					
Other improvements:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<hr/>					

Feel free to clarify any of your answers to 5(b), if necessary:

6. Do your City's practices prioritize among the types of capital intervention?

(e.g. alterations versus new facilities)

Yes. Continue to question 6(a) below.

No, all types of intervention have equal priority. Skip to question 7 below.

No, this has not been considered. Skip to question 7 below.

I do not know. Skip to question 7 below.

6(a). Which types of capital intervention get priority?

Only answer if you choose "Yes" to question 6 above. Otherwise skip to question 7 below.

	First Level Priority	Second Level Priority	Third or Lower Lever Priority	Not a Priority	Not Considered
Alterations and upgrades of existing facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintenance and repair of existing facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New facilities in existing developments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New facilities in new developments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other type of capital intervention: _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Do your City's practices incorporate measures of output or progress toward specific goals?

Yes. Continue to question 7(a) on the next page.

No. Skip to question 8 on the next page.

I do not know. Skip to question 8 on the next page.

7(a). What measures of output or progress are incorporated?

Check all that apply.

Only answer if you choose "Yes" to question 7 on the previous page. Otherwise skip to question 8.

Dollars spent

Staff time

Number of improvements

Length of the accessible pedestrian network

Number of destinations that are accessible to pedestrians with disabilities

Counts of pedestrian traffic including number of pedestrians with disabilities

Number of pedestrian accidents

Number of citizen complaints or lawsuits

Number of citizen requests met

Number of people with disabilities participating in government services or programs

Employment rate among people with disabilities

Other: _____

8. In one phrase, what is the highest priority objective of your City's effort to provide an accessible pedestrian network?

(e.g. tourism, meeting the needs of an aging population, reduced litigation risk, biggest bang for our buck, public health, etc.)

End of Survey. Thank you for your time.

Code Book

The following Code Book was used to translate the survey responses from the second questionnaire into defined variables, each with a defined domain of values. The underlined codes are variable names, usually corresponding to one question in the survey. The solid bullets underneath the variable names show the possible values for that variable.

1. Which city/county do you work for?

Not coded in order to maintain anonymity.

2. In normal circumstances, who pays for sidewalk construction, maintenance, and repair in your city/county?

q2

- ☐ Adjacent property owners.
 - 1
- ☐ City/County government.
 - 2
- ☐ Costs are shared between property owners and the government.
 - 3
- ☐ BLANK
 - 0

3. When improving the accessibility of its pedestrian rights-of-way, does the City/County try to spend resources equally across areas of the city/county according to some criteria?

q3

- ☐ Yes.
 - 1
- ☐ No, the City/County targets priority areas.
 - 2
- ☐ No, this has not been considered.
 - 3

- ☐ I do not know.
 - 4

- ☐ BLANK
 - 0

3(a). By what criteria does the City/County try to equalize the resources it spends?

- ☐ By administrative or electoral district ALSO By neighborhood council

q3a1

- Yes = 1
- No = BLANK = 0

- ☐ By area

q3a2

- Yes = 1
- No = BLANK = 0

- ☐ By length of the street network

q3a3

- Yes = 1
- No = BLANK = 0

- ☐ By length of the existing pedestrian network

q3a4

- Yes = 1
- No = BLANK = 0

- ☐ By rate of total pedestrian traffic

q3a5

- Yes = 1
- No = BLANK = 0

- ☐ By rate of pedestrian traffic by people with disabilities

q3a6

- Yes = 1
- No = BLANK = 0

- ☐ By total population

q3a7

- Yes = 1
- No = BLANK = 0

- ☐ By population of people with disabilities

q3a8

- Yes = 1
- No = BLANK = 0

- ☐ Other: Combination

q3a91

- Yes = 1
- No = BLANK = 0

- ☐ Other: Coordinated with street resurfacing = not equality

q3a92

- Yes = 1
- No = BLANK = 0

- ☐ Other: Share costs in volunteer program = not equality

q3a93

- Yes = 1
- No = BLANK = 0

- ☐ Other: Prioritize Areas with high traffic = not equality

q3a94

- Yes = 1
- No = BLANK = 0

- ☐ Other: By severity of damage (to sidewalk)

q3a95

- Yes = 1
- No = BLANK = 0

3(b). For the equalization strategies that you checked in 3(a) above, how does the City/County measure the resources it spends?

- ☐ Dollars spent

q3b1

- Yes = 1
- No = BLANK = 0

- ☐ Staff time

q3b2

- Yes = 1
- No = BLANK = 0

- ☐ Number of improvements

q3b3

- Yes = 1
- No = BLANK = 0

4. Do your City/County's practices prioritize based on location?q4

- ☐ Yes.
- 1
- ☐ No, all locations in the jurisdiction have equal priority.
- 2
- ☐ No, this has not been considered.
- 3
- ☐ I do not know.
- 4
- ☐ BLANK
- 0

4(a). What locations receive priority attention?

	First Level Priority	Second Level Priority	Third or Lower Level Priority	Not a Priority	Not Consid- ered	BLANK
For each	1	2	3	4	5	0

Question Number	
Proximity to Pedestrian Destinations ("Attractors" / "Pedestrian Generators")	
Near government buildings	q4a01
Near medical facilities	q4a02
Near schools	q4a03
Near other places of public accommodation (e.g. parks, churches)	q4a04
Near public housing	q4a05

	Question Number
Near accessible housing or residential facilities for people with disabilities	q4a06
Near public transit	q4a07
Near public parking garages	q4a08
Near major employers	q4a09
Near retail areas	q4a10
Near tourist areas	q4a11
Near other destinations: polling places	q4a12
Near other destinations: universities	q4a13
Near other destinations: grocery stores	q4a14
Near other destinations: bus stops	q4a15

Please give an example of how proximity is defined or measured.

q4a16

- Not Blank = 1
- BLANK = 0

Answer for q4a16 mentions declining points with distance

q4a17

- Yes = 1
- No or BLANK = 0

Answer for q4a16 states distance for first or only cut-off to get credit for proximity

q4a18

- First or only cut-off less than 1/8 mile = 1
- First or only cut-off at 1/8 mile = 2
- First or only cut-off greater than 1/8 mile = 3
- No cut-off mentioned or BLANK = 0

	Question Number
Neighborhood Character	
Areas with high residential population density	q4a20
Areas with high residential density of people with disabilities	q4a21
Downtown / Commercial centers	q4a22
Socially or economically disadvantaged residential districts	q4a23
Higher-rent residential districts	q4a24
Areas with the fewest existing pedestrian facilities	q4a25
Areas with the most existing pedestrian facilities	q4a26
Hillier terrain	q4a27
Less hilly terrain	q4a28
Areas with the lowest rates of physical activity / highest rates of obesity or diabetes	q4a29
Areas where pedestrian facilities (or lack of facilities) are the farthest from meeting ADA Accessibility Guidelines	q4a30
Locations Based on Existing Project Schedule	
Neighborhoods otherwise with priority for revitalization	q4a40
Corridors otherwise with priority for pedestrian improvements	q4a41
Corridors otherwise with priority for street reconstruction or maintenance	q4a42

	Question Number
Pedestrian Traffic	
Routes heavily traveled by pedestrians in general	q4a50
Routes heavily traveled by pedestrians with disabilities	q4a51
Routes where people with disabilities make up the smallest proportion of pedestrians	q4a52
Routes where people with disabilities make up the largest proportion of pedestrians	q4a53
Forecasts of future pedestrian traffic	q4a54
Safety	
Locations with the most pedestrian accidents	q4a60
Locations with the fewest pedestrian accidents	q4a61
Streets classified as pedestrian-friendly type	q4a62
Streets without pedestrian-friendly road design	q4a63
Public Input	
Locations identified in citizen requests or complaints	q4a70
Locations identified from public outreach	q4a71
Locations identified by an advisory board or committee	q4a72
Locations as required by a court, local access board, or federal agency with enforcement powers	q4a73

	Question Number
Locations identified by transportation agency, other agencies	q4a74
Cost	
Areas with greater design challenges (e.g. narrow right-of-way, hills)	q4a80
Areas with fewer design challenges	q4a81
Locations with available outside funding (e.g. grants, private development)	q4a82
Areas with liability potential	q4a83
Ownership	
Pathways under private control or ownership (e.g. driveways, privately maintained sidewalks)	q4a90
Pathways on public property	q4a91
New developments (public or private)	q4a92

Feel free to clarify any of your answers to 4(a), if necessary.

q4b

- Not Blank = 1
- BLANK = 0

5. Do your City/County's practices prioritize among specific improvements that provide accessibility?

q5

- ☐ Yes.
 - 1
- ☐ No, all specific improvement have equal priority.
 - 2
- ☐ No, this has not been considered.
 - 3
- ☐ I do not know.
 - 4
- ☐ BLANK
 - 0

5(a). Generally, what types of improvements get priority?

Need

- ☐ Improvements that remove or alleviate barriers faced by the greatest number or people

q5a01

- Yes = 1
- No = BLANK = 0

- ☐ Improvements that remove or alleviate the most severe barriers to access

q5a02

- Yes = 1
- No = BLANK = 0

- ☐ Improvements to existing facilities that are the farthest from meeting ADA Accessibility Guidelines

q5a03

- Yes = 1
- No = BLANK = 0

- ☐ Improvements to existing facilities that are the closest to meeting ADA Accessibility Guidelines

q5a04

- Yes = 1
- No = BLANK = 0

Public Input

- ☐ Improvements requested by citizens or citizen groups

q5a10

- Yes = 1
- No = BLANK = 0

- ☐ Improvements identified from public outreach

q5a11

- Yes = 1
- No = BLANK = 0

- ☐ Improvements identified by an advisory board or committee

q5a12

- Yes = 1
- No = BLANK = 0

Cost

- ☐ Most expensive improvements

q5a20

- Yes = 1
- No = BLANK = 0

- ☐ Least expensive improvements

q5a21

- Yes = 1
- No = BLANK = 0

- ☐ Improvements eligible for outside funding

q5a22

- Yes = 1
- No = BLANK = 0

Other

- ☐ Improvements associated with other funded projects

q5a30

- Yes = 1
- No = BLANK = 0

- ☐ Improvements that contribute to safety

q5a31

- Yes = 1
- No = BLANK = 0

5(b). What specific improvements get priority?

	First Level Priority	Second Level Priority	Third or Lower Level Priority	Not a Priority	Not Considered	BLANK
For each	1	2	3	4	5	0

	Question Number
Pedestrian Pathway (Pedestrian Access Route in the Pedestrian Circulation Path)	
Having a pedestrian circulation path	q5b01
Minimal running slope of path	q5b02
Minimal cross slope of path	q5b03
Greater path width	q5b04
Path clear of fixed obstructions (e.g. utility poles, benches)	q5b05
Prompt removal of temporary obstructions (e.g. trash, snow)	q5b06
Smooth path surface material	q5b07
Path surface material with traction	q5b08
Minimal vertical surface discontinuities in the path (e.g. breaks, heaves)	q5b09
Minimal openings in the path (e.g. holes, gratings)	q5b10
Driveway crossings that do not interfere with the pedestrian accessible route	q5b11
Curb Ramps	
Having a curb ramp at all street crossings	q5b20

	Question Number
Turning space at top of curb ramp	q5b21
Clear space at bottom of curb ramp	q5b22
Minimal running slope of curb ramp	q5b23
Minimal cross slope of curb ramp	q5b24
Greater curb ramp width	q5b25
Curb ramp flared sides	q5b26
Smooth transition between the curb ramp and the road surface	q5b27
Other curb ramp improvement: Grade breaks perpendicular to the direction of travel	q5b28
Other curb ramp improvement: Detectable Warning Surfaces (DWS) on all curb ramps	q5b29
Drainage	
Drainage to avoid pooling of water or ice in the pedestrian pathway	q5b30
Boundary of the Pedestrian Pathway	
Detectable warning surfaces (DWS) at flush boundaries	q5b40
Clearly defined route edges (detectable by cane, foot, or wheel)	q5b41
Visual and texture contrast at boundary (e.g. planted borders)	q5b42
Other improvement to the boundary of pedestrian pathway: Greater width of buffer between sidewalk and street	q5b43

	Question Number
Other improvement to the boundary of pedestrian pathway: Truncated domes of DWS lined up with crossing	q5b44
Street Crossings	
Designated street crossings (e.g. crosswalk striping)	q5b50
Signalized pedestrian crossings with Audible Pedestrian Signals (APS)	q5b51
Signalized pedestrian crossings (without APS)	q5b52
Reduced distance to cross the road (e.g. bump-outs, refuge islands)	q5b53
Other improvement at street crossings: Adequate crossing time at signalized crossings	q5b54
Accessible Parking	
Accessible parking	q5b60
Accessible passenger loading zones	q5b61
Street Furniture	
Drinking fountains	q5b70
Accessible public toilets	q5b71
Benches or tables	q5b72
Handrails	q5b73
Shelters and loading areas for street transit (e.g. bus, BRT, light rail)	q5b74
Wayfinding	
Clearly marked and identified accessible routes	q5b80

	Question Number
Signs directing pedestrians to accessible entrances	q5b81
Signs pointing toward major destinations	q5b82
Fixed signs with area maps or directories	q5b83
Steep Pathways or Vertical Level Changes	
Ramps	q5b90
Public elevators	q5b91
Other improvement for vertical level changes: stairs	q5b92

Feel free to clarify any of your answers to 5(b), if necessary.

q5c

- Not Blank = 1
- BLANK = 0

Answers for q5a, free answers in q5b, or q5c include additional mention of focus on curb ramps

q5c1

- Yes = 1
- No or BLANK = 0

Answer for “What other curb ramp improvement?” or other free answers in this section mentions that the policy is to replace the entire ramp if any feature needs retrofitting.

q5c2

- Yes = 1
- No or BLANK = 0

6. Do your City/County's practices prioritize among the types of capital intervention?

(e.g. alterations versus new facilities)

q6

- ☐ Yes.
 - 1
- ☐ No, all types of intervention have equal priority.
 - 2
- ☐ No, this has not been considered.
 - 3
- ☐ I do not know.
 - 4
- ☐ BLANK
 - 0

6(a). Which types of capital intervention get priority?

	First Level Priority	Second Level Priority	Third or Lower Lever Priority	Not a Priority	Not Consid- ered	BLANK
For each	1	2	3	4	5	0

	Question Number
Alterations and upgrades of existing facilities	q6a1
Maintenance and repair of existing facilities	q6a2
New facilities in existing developments	q6a3
New facilities in new developments	q6a4

7. Do your City/County's practices incorporate measures of output or progress toward specific goals?

q7

- ☐ Yes.
 - 1
- ☐ No.
 - 2
- ☐ I do not know.
 - 4
- ☐ BLANK
 - 0

7(a). What measures of output or progress are incorporated?

- ☐ Dollars spent

q7a01

- Yes = 1
- No = BLANK = 0

- ☐ Staff time

q7a02

- Yes = 1
- No = BLANK = 0

- ☐ Number of improvements

q7a03

- Yes = 1
- No = BLANK = 0

- ☐ Length of the accessible pedestrian network

q7a04

- Yes = 1
- No = BLANK = 0

- ☐ Number of destinations that are accessible to pedestrians with disabilities

q7a05

- Yes = 1
- No = BLANK = 0

- ☐ Counts of pedestrian traffic including number of pedestrians with disabilities

q7a06

- Yes = 1
- No = BLANK = 0

- ☐ Number of pedestrian accidents

q7a07

- Yes = 1
- No = BLANK = 0

- ☐ Number of citizen complaints or lawsuits

q7a08

- Yes = 1
- No = BLANK = 0

- ☐ Number of citizen requests met

q7a09

- Yes = 1
- No = BLANK = 0

- ☐ Number of people with disabilities participating in government services or programs

q7a10

- Yes = 1
- No = BLANK = 0

- ☐ Employment rate among people with disabilities

q7a11

- Yes = 1
- No = BLANK = 0

8. In one phrase, what is the highest priority objective of your City/County's effort to provide an accessible pedestrian network?

q8

- Not Blank = 1
- BLANK = 0

For each equity pattern, there is a variable labeled q8aXXX, where the XXX corresponds to that number code for that equity pattern. The value for each variable is determined by whether the open answer for question 8 of the second survey or the answers for questions 6 and 7 of the first survey include a mention or suggestion of that type of equity.

- Yes in either q8 or {1Q6 or 1Q7} but not both = 1
- Yes in both q8 and {1Q6 or 1Q7} = 2
- No = BLANK = 0

Special for q8a521 only: include a 1 if there is a mention anywhere in the survey that accessibility compliance is baked in to the process of permitting or approving projects (other than just projects undertaken by the local government itself).

Stata Code

The following is the contents of a Stata “do” file used to translate the coded survey results into scores for the applied equity patterns of my taxonomy.

```
capture clear
use Survey.DTA

/* SET UP */

/* Set up for q4a calculations */
/* Finding average priority for proximity to public facilities.
*/
g pubfaczero=0
la var pubfaczero "Number of BLANK answers in proximity to public
facilities"
replace pubfaczero=pubfaczero+1 if q4a01==0
replace pubfaczero=pubfaczero+1 if q4a03==0
replace pubfaczero=pubfaczero+1 if q4a05==0
replace pubfaczero=pubfaczero+1 if q4a07==0
replace pubfaczero=pubfaczero+1 if q4a12==0
replace pubfaczero=pubfaczero+1 if q4a15==0
g pubfacavg=(q4a01+q4a03+q4a05+q4a07+q4a12+q4a15)/(6-pubfaczero)
if pubfaczero!=6
replace pubfacavg=0 if pubfaczero==6
la var pubfacavg "Average priority of proximity to public
facilities"
/*Finding average priority for proximity to private facilities.
*/
g privfaczero=0
la var privfaczero "Number of BLANK answers in proximity to
private facilities"
replace privfaczero=privfaczero+1 if q4a04==0
replace privfaczero=privfaczero+1 if q4a09==0
replace privfaczero=privfaczero+1 if q4a10==0
replace privfaczero=privfaczero+1 if q4a11==0
replace privfaczero=privfaczero+1 if q4a14==0
g privfacavg=(q4a01+q4a03+q4a05+q4a07+q4a12+q4a15)/(5-
privfaczero) if privfaczero!=5
replace privfacavg=0 if privfaczero==5
la var privfacavg "Average priority of proximity to private
facilities"

/* Set up for q5b calculations */
/* Finding average priority for improvements in the pedestrian
path. */
g pedpathzero=0
la var pedpathzero "Number of BLANK answers in q5b02-11"
replace pedpathzero=pedpathzero+1 if q5b02==0
replace pedpathzero=pedpathzero+1 if q5b03==0
```

```

replace pedpathzero=pedpathzero+1 if q5b04==0
replace pedpathzero=pedpathzero+1 if q5b05==0
replace pedpathzero=pedpathzero+1 if q5b06==0
replace pedpathzero=pedpathzero+1 if q5b07==0
replace pedpathzero=pedpathzero+1 if q5b08==0
replace pedpathzero=pedpathzero+1 if q5b09==0
replace pedpathzero=pedpathzero+1 if q5b10==0
replace pedpathzero=pedpathzero+1 if q5b11==0
g pedpathavg=(q5b02+q5b03+q5b04+q5b05+q5b06+q5b07+q5b08+q5b09+q5b
10+q5b11)/(10-pedpathzero) if pedpathzero!=10
replace pedpathavg=0 if pedpathzero==10
la var pedpathavg "Average priority of improvements in the
pedestrian path"
/* Finding average priority for improvements in curb ramps. */
g curbrampzero=0
la var curbrampzero "Number of BLANK answers in q5b21-29"
replace curbrampzero=curbrampzero+1 if q5b21==0
replace curbrampzero=curbrampzero+1 if q5b22==0
replace curbrampzero=curbrampzero+1 if q5b23==0
replace curbrampzero=curbrampzero+1 if q5b24==0
replace curbrampzero=curbrampzero+1 if q5b25==0
replace curbrampzero=curbrampzero+1 if q5b26==0
replace curbrampzero=curbrampzero+1 if q5b27==0
replace curbrampzero=curbrampzero+1 if q5b28==0
replace curbrampzero=curbrampzero+1 if q5b29==0
g curbrampavg=(q5b21+q5b22+q5b23+q5b24+q5b25+q5b26+q5b27+q5b28+q5
b29)/(9-curbrampzero) if curbrampzero!=9
replace curbrampavg=0 if curbrampzero==9
la var curbrampavg "Average priority of improvements in curb
ramps"
/* Finding average priority for facilities that benefit those
with the most severe disabilities but not so much those with
the most common disabilities. */
g facsseverezero=0
la var facsseverezero "Number of BLANK answers in facilities for
the most severe disabilities only"
replace facsseverezero=facsseverezero+1 if q5b02==0
replace facsseverezero=facsseverezero+1 if q5b03==0
replace facsseverezero=facsseverezero+1 if q5b04==0
replace facsseverezero=facsseverezero+1 if q5b05==0
replace facsseverezero=facsseverezero+1 if q5b10==0
replace facsseverezero=facsseverezero+1 if q5b11==0
replace facsseverezero=facsseverezero+1 if q5b21==0
replace facsseverezero=facsseverezero+1 if q5b22==0
replace facsseverezero=facsseverezero+1 if q5b23==0
replace facsseverezero=facsseverezero+1 if q5b24==0
replace facsseverezero=facsseverezero+1 if q5b25==0
replace facsseverezero=facsseverezero+1 if q5b26==0
replace facsseverezero=facsseverezero+1 if q5b27==0
replace facsseverezero=facsseverezero+1 if q5b29==0
replace facsseverezero=facsseverezero+1 if q5b40==0
replace facsseverezero=facsseverezero+1 if q5b44==0
replace facsseverezero=facsseverezero+1 if q5b51==0
replace facsseverezero=facsseverezero+1 if q5b60==0

```

```

replace facsseverezero=facsseverezero+1 if q5b61==0
replace facsseverezero=facsseverezero+1 if q5b80==0
replace facsseverezero=facsseverezero+1 if q5b81==0
replace facsseverezero=facsseverezero+1 if q5b90==0
replace facsseverezero=facsseverezero+1 if q5b91==0
g facssevereavg=(q5b02+q5b03+q5b04+q5b05+q5b10+q5b11+q5b21+q5b22+
    q5b23+q5b24+q5b25+q5b26+q5b27+q5b29+q5b40+q5b44+q5b51+q5b60
    +q5b61+q5b80+q5b81+q5b90+q5b91)/(23-facsseverezero) if
    facsseverezero!=23
replace facssevereavg=0 if facsseverezero==23
la var facssevereavg "Average priority of facilities for the most
    severe disabilities only"
/* Finding average priority for facilities that benefit both
those with the most severe disabilities and those with the
most common disabilities. */
g facsbothzero=0
la var facsbothzero "Number of BLANK answers in facilities that
    benefit both severe and common"
replace facsbothzero=facsbothzero+1 if q5b06==0
replace facsbothzero=facsbothzero+1 if q5b07==0
replace facsbothzero=facsbothzero+1 if q5b09==0
replace facsbothzero=facsbothzero+1 if q5b20==0
replace facsbothzero=facsbothzero+1 if q5b28==0
replace facsbothzero=facsbothzero+1 if q5b30==0
replace facsbothzero=facsbothzero+1 if q5b71==0
replace facsbothzero=facsbothzero+1 if q5b74==0
g facsbothavg=(q5b06+q5b07+q5b09+q5b20+q5b28+q5b30+q5b71+q5b74)/(
    8-facsbothzero) if facsbothzero!=8
replace facsbothavg=0 if facsbothzero==8
la var facsbothavg "Average priority of facilities that benefit
    both severe and common"
/* Finding average priority for facilities that benefit those
with the most common disabilities but not so much those with
the most severe disabilities. */
g facscommonzero=0
la var facscommonzero "Number of BLANK answers in facilities for
    the most common disabilities only"
replace facscommonzero=facscommonzero+1 if q5b01==0
replace facscommonzero=facscommonzero+1 if q5b08==0
replace facscommonzero=facscommonzero+1 if q5b43==0
replace facscommonzero=facscommonzero+1 if q5b50==0
replace facscommonzero=facscommonzero+1 if q5b52==0
replace facscommonzero=facscommonzero+1 if q5b53==0
replace facscommonzero=facscommonzero+1 if q5b54==0
replace facscommonzero=facscommonzero+1 if q5b70==0
replace facscommonzero=facscommonzero+1 if q5b72==0
replace facscommonzero=facscommonzero+1 if q5b73==0
replace facscommonzero=facscommonzero+1 if q5b82==0
replace facscommonzero=facscommonzero+1 if q5b83==0
g facscommonavg=(q5b01+q5b08+q5b43+q5b50+q5b52+q5b53+q5b54+q5b70+
    q5b72+q5b73+q5b82+q5b83)/(12-facscommonzero) if
    facscommonzero!=12
replace facscommonavg=0 if facscommonzero==12

```

```

la var facscommonavg "Average priority of facilities for the most
    common disabilities only"
/* Finding average priority of facilities that benefit those with
    the most severe disabilities, regardless of whether they
    also benefit those with the most common disabilities. */
g facsseverebothavg=((facssevereavg*23)+(facsbothavg*8))/31 if
    facssevereavg!=0 & facsbothavg!=0
replace facsseverebothavg=facssevereavg if facsbothavg==0
replace facsseverebothavg=facsbothavg if facssevereavg==0
la var facsseverebothavg "Average priority of facilities for the
    most severe disabilities inclusive"
/* Finding average priority of facilities that benefit those with
    the most common disabilities, regardless of whether they
    also benefit those with the most severe disabilities. */
g facscommonbothavg=((facscommonavg*12)+(facsbothavg*8))/20 if
    facscommonavg!=0 & facsbothavg!=0
replace facscommonbothavg=facscommonavg if facsbothavg==0
replace facscommonbothavg=facsbothavg if facscommonavg==0
la var facscommonbothavg "Average priority of facilities for the
    most common disabilities inclusive"

/* New Variables for each Equity Type */

/* ADEQUACY */

/* 110 Adequacy Total */
g e110=0
la var e110 "Adequacy Total"
/* If no chance for 1 and 2 */ replace e110=e110+2 if q4==2
/* 1 */ replace e110=e110+1 if q4a25==1 | q4a26==1
replace e110=e110+0.5 if (q4a25==2 | q4a26==2) & q4a25!=1 &
    q4a26!=1
/* 2 */ replace e110=e110+1 if q4a63==1
replace e110=e110+0.5 if q4a63==2
/* 3 */ replace e110=e110+1 if q5==1
/* 4 */ replace e110=e110+1 if q5a03==1 | q5a04==1
/* 5 */ replace e110=e110+1 if q5b01<pedpathavg & q5b01!=0 &
    q5b01!=4
/* 6 */ replace e110=e110+1 if q5b20<curbrampavg & q5b20!=0 &
    q5b20!=4
/* 7 */ replace e110=e110+1 if q6a2==1
replace e110=e110+0.5 if q6a2==2
/* 8 */ replace e110=e110+1 if q6a4==1
replace e110=e110+0.5 if q6a4==2
/* 9 and 10 */ replace e110=e110+2 if q8110==2 | q8111==2 /* No
    q8112 */
replace e110=e110+1 if (q8110==1 | q8111==1) & q8110!=2 &
    q8111!=2
/* Normalize */ replace e110=e110/10

/* 111 Prioritize improving inadequacies that are the least
    adequate */
g e111=0

```

```

la var e111 "Prioritize least adequate"
/* 1 */ replace e111=e111+1 if q3a95==1
/* 2 */ replace e111=e111+1 if q4a25<q4a26 & q4a25!=0 & q4a25!=4
replace e111=e111+1 if q4a26==0 & q4a25==1
replace e111=e111+0.5 if q4a26==0 & q4a25==2
/* 3 */ replace e111=e111+1 if q4a30==1
replace e111=e111+0.5 if q4a30==2
/* 4 */ replace e111=e111+1 if q4a63==1
replace e111=e111+1 if q4a63==2
/* 5 */ replace e111=e111+1 if q5a03==1
/* 6 and 7 */ replace e111=e111+q8111
/* Normalize */ replace e111=e111/7

/* 112 Prioritize improving inadequacies that are the closest to
being adequate */
g e112=0
la var e112 "Prioritize closest to adequate"
/* 1 */ replace e112=e112+1 if q4a25>q4a26 & q4a26!=0 & q4a26!=4
replace e111=e111+1 if q4a25==0 & q4a26==1
replace e111=e111+0.5 if q4a25==0 & q4a26==2
/* 2 */ replace e112=e112+1 if q5a04==1
/* No q8112 */
/* Normalize */ replace e112=e112/4

/* EQUAL INPUTS */

/* 210 Equal Inputs Total */
g e210=0
la var e210 "Equal Inputs Total"
/* 1 */ replace e210=e210+1 if q3==1
/* q4-6 should not be counted here. Equal inputs would suggest an
answer of No to questions 4-6, but a No answer to questions 4-6
does not reliably indicate equal inputs. */
/* 2 and 3 */ replace e210=e210+q8211 /* No q8210; No q8212-217
*/
/* Normalize */ replace e210=e210/3

/* 211 Equal resource input for each administrative district */
g e211=0
la var e211 "Equal inputs by admin district"
/* 1 */ replace e211=e211+1 if q3a1==1
/* 2 and 3 */ replace e211=e211+q8211
/* Normalize */ replace e211=e211/3

/* 212 Equal resource input by area of district */
g e212=0
la var e212 "Equal inputs by area"
/* 1 */ replace e212=e212+1 if q3a2==1
/* No q8212 */
/* Normalize */ replace e212=e212/3

/* "Equal resource inputs by length of the street network" is not
included because this equity is captured directly in only

```

```

        one question, only one respondent answered positively to
        that question, and that same respondent also
        contradictorally answered positively to the question for
        213. */

/* 213 Equal resource input by length of the existing pedestrian
    network */
g e213=0
la var e213 "Equal inputs by length of pednet"
/* 1 */ replace e213=e213+1 if q3a4==1
/* No q8213 */
/* Normalize */ replace e213=e213/3

/* 214 Equal resource input by total pedestrian traffic */
g e214=0
la var e214 "Equal inputs by total ped traffic"
/* 1 */ replace e214=e214+1 if q3a5==1
/* No q8214 */
/* Normalize */ replace e214=e214/3

/* 215 Equal resource input by traffic of pedestrians with
    disabilities */
g e215=0
la var e215 "Equal inputs by disability ped traffic"
/* 1 */ replace e215=e215+1 if q3a6==1
/* No q8215 */
/* Normalize */ replace e215=e215/3

/* 216 Equal resource input by total population */
g e216=0
la var e216 "Equal inputs by total pop"
/* 1 */ replace e216=e216+1 if q3a7==1
/* No q8216 */
/* Normalize */ replace e216=e216/3

/* 217 Equal resource input by population of people with
    disabilities */
g e217=0
la var e217 "Equal inputs by disability pop"
/* 1 */ replace e217=e217+1 if q3a8==1
/* No q8217 */
/* Normalize */ replace e217=e217/3

/* EQUAL OPPORTUNITY */

/* 220 Equal Opportunity Total */
/* Not really possible to capture. */

/* 221 Formal Equality of Opportunity to use the pedestrian
    network */
g e221=0
la var e221 "Formal Equality of Opportunity pednet"

```

```

/* Prioritize anywhere, but the ped network must be accessible to
   everyone. */
/* 1 */ replace e221=e221+1 if q4a25<q4a26 & q4a25!=0 & q4a25!=4
replace e221=e221+1 if q4a26==0 & q4a25==1
replace e221=e221+0.5 if q4a26==0 & q4a25==2
/* 2 */ replace e221=e221+1 if q5b01<4 & q5b01!=0
/* 3 */ replace e221=e221+1 if q5b02<4 & q5b02!=0
/* 4 */ replace e221=e221+1 if q5b03<4 & q5b03!=0
/* 5 */ replace e221=e221+1 if q5b04<4 & q5b04!=0
/* 6 */ replace e221=e221+1 if q5b05<4 & q5b05!=0
/* 7 */ replace e221=e221+1 if q5b06<4 & q5b06!=0
/* 8 */ replace e221=e221+1 if q5b09<4 & q5b09!=0
/* 9 */ replace e221=e221+1 if q5b10<4 & q5b10!=0
/* 10 */ replace e221=e221+1 if q5b20<4 & q5b20!=0
/* 11 */ replace e221=e221+1 if q5b21<4 & q5b21!=0
/* 12 */ replace e221=e221+1 if q5b22<4 & q5b22!=0
/* 13 */ replace e221=e221+1 if q5b23<4 & q5b23!=0
/* 14 */ replace e221=e221+1 if q5b24<4 & q5b24!=0
/* 15 */ replace e221=e221+1 if q5b25<4 & q5b25!=0
/* 16 */ replace e221=e221+1 if q5b26<4 & q5b26!=0
/* 17 */ replace e221=e221+1 if q5b27<4 & q5b27!=0
/* 18 */ replace e221=e221+1 if q5b30<4 & q5b30!=0
/* 19 */ replace e221=e221+1 if q5b40<4 & q5b40!=0
/* 20 */ replace e221=e221+1 if q5b50<4 & q5b50!=0
/* 21 */ replace e221=e221+1 if q5b51<q5b52 & q5b51!=0 & q5b51!=4
replace e221=e221+1 if q5b52==0 & q5b51<4 & q5b51!=0
/* 22 */ replace e221=e221+1 if q5b53<4 & q5b53!=0
/* 23 */ replace e221=e221+1 if q5b54<4 & q5b54!=0
/* 24 */ replace e221=e221+1 if q5b71<4 & q5b71!=0
/* 25 */ replace e221=e221+1 if q5b73<4 & q5b73!=0
/* 26 */ replace e221=e221+1 if q5b80<4 & q5b80!=0
/* 27 */ replace e221=e221+1 if q5b81<4 & q5b81!=0
/* 28 */ replace e221=e221+1 if q5b90<4 & q5b90!=0
/* 29 */ replace e221=e221+1 if q5b91<4 & q5b91!=0
/* 30 */ replace e221=e221+1 if q7a05==1
/* 31 and 32 */ replace e221=e221+q8221
/* Normalize */ replace e221=e221/32

/* 222 Fair Equality of Opportunity to use the pedestrian network
   */
/* Needs to incorporate e221, since Fair Equality of Opportunity
   requires at least Formal Equality of Opportunity. */
g e222=e221*32-q8221
la var e221 "Fair Equality of Opportunity pednet"
/* 1 */ replace e222=e222+1 if q4a52<q4a53 & q4a52!=0 & q4a52!=4
replace e222=e222+1 if q4a53==0 & q4a52==1
replace e222=e222+0.5 if q4a53==0 & q4a52==2
/* 2 */ replace e222=e222+1 if q7a06==1
/* 3 and 4 */ replace e222=e222+q8222
/* Normalize */ replace e222=e222/(4+(32-2))

/* 223 Formal Equality of Opportunity to access government
   services */
g e223=0

```

```

la var e223 "Formal Equality of Opportunity govserv"
/* 1 */ replace e223=e223+1 if q4a01==1
replace e223=e223+.5 if q4a01==2
/* 2 */ replace e223=e223+1 if q4a03==1
replace e223=e223+.5 if q4a03==2
/* 3 */ replace e223=e223+1 if q4a05==1
replace e223=e223+.5 if q4a05==2
/* 4 */ replace e223=e223+1 if q4a07==1
replace e223=e223+.5 if q4a07==2
/* 5 */ replace e223=e223+1 if q4a12==1
replace e223=e223+.5 if q4a12==2
/* 6 */ replace e223=e223+1 if q4a15==1
replace e223=e223+.5 if q4a15==2
/* 7 */ replace e223=e223+1 if pubfacavg<privfacavg &
    pubfacavg!=0 & pubfacavg<4
/* 8 */ replace e223=e223+1 if q4a91<q4a90 & q4a91!=0 & q4a91!=4
replace e223=e223+1 if q4a90==0 & q4a91==1
replace e223=e223+0.5 if q4a90==0 & q4a91==2
/* 9 and 10 */ replace e223=e223+q8223
/* Normalize */ replace e223=e223/10

/* 224 Fair Equality of Opportunity to access government services
    */
/* Needs to incorporate e223, since Fair Equality of Opportunity
    requires at least Formal Equality of Opportunity. */
g e224=e223*10-q8223
la var e224 "Fair Equality of Opportunity govserv"
/* 1 */ replace e224=e224+1 if q7a10==1
/* No q8224 */
/* Normalize */ replace e224=e224/(3+(10-2))

/* 225 Formal Equality of Opportunity across major life
    activities including employment */
g e225=0
la var e225 "Formal Equality of Opportunity lifeacts"
/* 1 */ replace e225=e225+1 if q4a03==1 | q4a13==1
replace e225=e225+0.5 if (q4a03==2 | q4a13==2) & q4a03!=1 &
    q4a13!=1
/* 2 */ replace e225=e225+1 if q4a09==1
replace e225=e225+0.5 if q4a09==2
/* 3 */ replace e225=e225+1 if q4a10==1 | q4a14==1
replace e225=e225+0.5 if (q4a10==2 | q4a14==2) & q4a10!=1 &
    q4a14!=1
/* 4 and 5 */ replace e225=e225+q8225
/* Normalize */ replace e225=e225/5

/* 226 Fair Equality of Opportunity across major life activities
    including employment */
g e226=e225*5-q8225
la var e226 "Fair Equality of Opportunity lifeacts"
/* Needs to incorporate e225, since Fair Equality of Opportunity
    requires at least Formal Equality of Opportunity. */
/* 1 */ replace e226=e226+1 if q4a52<q4a53 & q4a52!=0 & q4a52!=4
replace e226=e226+1 if q4a53==0 & q4a52==1

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```

replace e226=e226+0.5 if q4a53==0 & q4a52==2
/* 2 */ replace e226=e226+1 if q7a10==1
/* 3 */ replace e226=e226+1 if q7a11==1
/* No q8226 */
/* Normalize */ replace e226=e226/(5+(5-2))

/* EQUAL OUTPUTS */

/* 230 Equal Outputs Total */
g e230=0
la var e230 "Equal outputs Total"
/* 1 */ replace e230=e230+1 if q7==1
/* 2 */ replace e230=e230+1 if q3b3==1
/* No q8230-237 */
/* Normalize */ replace e230=e230/4
/* Make sure that q7 answer is Yes */ replace e230=0 if q7!=1

/* For the patterns in Equal Outputs, when an answer to question
   3a matches, what gets added is not 1 but instead is the
   value of e230. This is because question 3 is worded for
   equal *inputs* not *outputs*, and although we need the
   answer to question 3 to distinguish among the patterns of
   equal outputs, it would be misleading to give one of the
   patterns a 100 percent match if in reality that
   jurisdiction were really clearly using the corresponding
   pattern of equal *inputs*. This way, there must be evidence
   from elsewhere in the survey that the jurisdiction is using
   an Equal Outputs pattern before we can count the answer to
   question 3 toward a specific pattern of Equal Outputs.
   Furthermore, no normalization is necessary because the
   normalization is already taken care of in the normalization
   for e230, and none of these patterns were expressed in the
   open answers. (No q8230-237) */

/* 231 Equal output for each administrative district */
g e231=0
la var e231 "Equal outputs by admin district"
replace e231=e230 if q3a1==1

/* 232 Equal output by area of district */
g e232=0
la var e232 "Equal outputs by area"
replace e232=e230 if q3a2==1

/* "Equal outputs by length of the street network" is not
   included because this equity is captured in only one
   question, only one respondent answered positively to that
   question, and that same respondent also contradictorally
   answered positively to the question for 213/233. */

/* 233 Equal output by length of the existing pedestrian network
   */
g e233=0

```

```

la var e233 "Equal outputs by length of pednet"
replace e233=e230 if q3a4==1

/* 234 Equal output by total pedestrian traffic */
g e234=0
la var e234 "Equal outputs by total ped traffic"
replace e234=e230 if q3a5==1

/* 235 Equal output by traffic of pedestrians with disabilities
*/
g e235=0
la var e235 "Equal outputs by disability ped traffic"
replace e235=e230 if q3a6==1

/* 236 Equal output by total population */
g e236=0
la var e236 "Equal outputs by total pop"
replace e236=e230 if q3a7==1

/* 237 Equal output by population of people with disabilities */
g e237=0
la var e237 "Equal outputs by disability pop"
replace e237=e230 if q3a8==1

/* EQUAL BENEFITS */

/* 241 Equal benefits of pedestrian access for people at all
points on the range of physical abilities */
/* Not q5a02, which prioritizes improvements that alleviate the
most severe barriers, because such should have equal
priority with improvements that help people with other
types of disabilities. */
/* This equity is not tested for in this survey, unfortunately.
*/
/* No q8241 */

/* REDRESS */

/* 310 Redress Total */
/* Not really possible to capture. */

/* 311 Redress for people with disabilities */
g e311=0
la var e311 "Redress for disability"
/* 1 */ replace e311=e311+1 if q5a02==1
/* 2 */ replace e311=e311+1 if facscommonavg-facsseverebothavg>0
& facsseverebothavg!=0
/* 3 */ replace e311=e311+1 if facscommonavg-facsseverebothavg>1
& facsseverebothavg!=0
/* 4 */ replace e311=e311+1 if facscommonavg-facsseverebothavg>2
& facsseverebothavg!=0
/* 5 */ replace e311=e311+1 if q5c1==1

```

```

/* 6 and 7 */ replace e311=e311+q8311
/* Normalize */ replace e311=e311/7

/* 312 Redress for people with economic or social disadvantages
   */
g e312=0
la var e312 "Redress for econ soc disadvantages"
/* 1 */ replace e312=e312+1 if q4a23<q4a24 & q4a23!=0 & q4a23!=4
replace e312=e312+1 if q4a24==0 & q4a23==1
replace e312=e312+0.5 if q4a24==0 & q4a23==2
/* 2 */ replace e312=e312+1 if q6a3==1
replace e312=e312+0.5 if q6a3==2
/* No q8312 */
/* Normalize */ replace e312=e312/4

/* DIFFERENCE PRINCIPLE */

/* 321 Prioritize improvements that benefit a wide range of
   people and also specifically benefit people with the most
   severe disabilities */
g e321=0
la var e321 "Maximin"
/* 1 */ replace e321=e321+1 if q4a02==1
replace e321=e321+0.5 if q4a02==2
/* 2 */ replace e321=e321+1 if q4a50==q4a51 & q4a50!=0 & q4a50<4
/* 3 */ replace e321=e321+1 if q4a60<q4a61 & q4a60!=0 & q4a60!=4
replace e321=e321+1 if q4a61==0 & q4a60==1
replace e321=e321+0.5 if q4a61==0 & q4a60==2
/* 4 */ replace e321=e321+1 if q5a01==1 & q5a02==1
/* 5 */ replace e321=e321+1 if q5b06==1
replace e321=e321+0.5 if q5b06==2
/* 6 */ replace e321=e321+1 if q5b07==1
replace e321=e321+0.5 if q5b07==2
/* 7 */ replace e321=e321+1 if q5b09==1
replace e321=e321+0.5 if q5b09==2
/* 8 */ replace e321=e321+1 if q5b20==1
replace e321=e321+0.5 if q5b20==2
/* 9 */ replace e321=e321+1 if q5b28==1
replace e321=e321+0.5 if q5b28==2
/* 10 */ replace e321=e321+1 if q5b30==1
replace e321=e321+0.5 if q5b30==2
/* 11 */ replace e321=e321+1 if q5b71==1
replace e321=e321+0.5 if q5b71==2
/* 12 */ replace e321=e321+1 if q5b74==1
replace e321=e321+0.5 if q5b74==2
/* No q8321 */
/* Normalize */ replace e321=e321/14

/* UTILITARIANISM */

/* 330 Utilitarianism Total */
/* Not really possible to capture. */

```

```

/* 331 Maximize the fulfillment of average satisfactions */
g e331=0
la var e331 "Maximize fulfillment of average satisfactions"
/* Assume that facilities are optimized for "normal" able-bodied
   pedestrians. */
/* First, heavily traveled areas: */
/* 1 */ replace e331=e331+1 if q4a01==1 | q4a12==1
replace e331=e331+0.5 if (q4a01==2 | q4a12==2) & q4a01!=1 &
    q4a12!=1
/* 2 */ replace e331=e331+1 if q4a02==1
replace e331=e331+0.5 if q4a02==2
/* 3 */ replace e331=e331+1 if q4a03==1 | q4a13==1
replace e331=e331+0.5 if (q4a03==2 | q4a13==2) & q4a03!=1 &
    q4a13!=1
/* 4 */ replace e331=e331+1 if q4a04==1
replace e331=e331+0.5 if q4a04==2
/* 5 */ replace e331=e331+1 if q4a05==1
replace e331=e331+0.5 if q4a05==2
/* 6 */ replace e331=e331+1 if q4a06==1
replace e331=e331+0.5 if q4a06==2
/* 7 */ replace e331=e331+1 if q4a07==1 | q4a15==1
replace e331=e331+0.5 if (q4a07==2 | q4a15==2) & q4a07!=1 &
    q4a15!=1
/* 8 */ replace e331=e331+1 if q4a08==1
replace e331=e331+0.5 if q4a08==2
/* 9 */ replace e331=e331+1 if q4a09==1
replace e331=e331+0.5 if q4a09==2
/* 10 */ replace e331=e331+1 if q4a10==1 | q4a14==1
replace e331=e331+0.5 if (q4a10==2 | q4a14==2) & q4a10!=1 &
    q4a14!=1
/* 11 */ replace e331=e331+1 if q4a11==1
replace e331=e331+0.5 if q4a11==2
/* 12 */ replace e331=e331+1 if q4a22==1
replace e331=e331+0.5 if q4a22==2
/* 13 */ replace e331=e331+1 if q4a50<=q4a51 & q4a50!=0 & q4a50<4
replace e331=e331+1 if q4a51==0 & q4a50==1
replace e331=e331+0.5 if q4a51==0 & q4a50==2
/* 14 */ replace e331=e331+1 if q4a54==1
replace e331=e331+0.5 if q4a54==2
/* Then facilities for able-bodied pedestrians: */
/* 15 */ replace e331=e331+1 if q5b01==1
replace e331=e331+0.5 if q5b01==2
/* 16 */ replace e331=e331+1 if q5b04==1
replace e331=e331+0.5 if q5b04==2
/* 17 */ replace e331=e331+1 if q5b06==1
replace e331=e331+0.5 if q5b06==2
/* 18 */ replace e331=e331+1 if q5b30==1
replace e331=e331+0.5 if q5b30==2
/* 19 */ replace e331=e331+1 if q5b43==1
replace e331=e331+0.5 if q5b43==2
/* 20 */ replace e331=e331+1 if q5b50==1
replace e331=e331+0.5 if q5b50==2
/* 21 */ replace e331=e331+1 if q5b52<q5b51 & q5b52!=0 & q5b52!=4

```

```

replace e331=e331+1 if q5b51==0 & q5b52==1
replace e331=e331+0.5 if q5b51==0 & q5b52==2
/* 22 */ replace e331=e331+1 if q5b70==1
replace e331=e331+0.5 if q5b70==2
/* 23 */ replace e331=e331+1 if q5b72==1
replace e331=e331+0.5 if q5b72==2
/* 24 */ replace e331=e331+1 if q5b92==1
replace e331=e331+0.5 if q5b92==2
/* No q8331 */
/* Normalize */ replace e331=e331/26

/* 332 Maximize the utility of people who have the most to gain
      from the most achievable accommodations */
g e332=0
la var e332 "Maximize utility for most to gain"
/* 1 */ replace e332=e332+1 if q5b01==1
replace e332=e332+0.5 if q5b01==2
/* 2 */ replace e332=e332+1 if q5b02<q5b03 & q5b02!=0 & q5b03<4
replace e332=e332+1 if q5b03==0 & q5b02==1
replace e332=e332+0.5 if q5b03==0 & q5b02==2
/* 3 */ replace e332=e332+1 if q5b04==1
replace e332=e332+0.5 if q5b04==2
/* 4 */ replace e332=e332+1 if q5b05==1
replace e332=e332+0.5 if q5b05==2
/* 5 */ replace e332=e332+1 if q5b06==1
replace e332=e332+0.5 if q5b06==2
/* 6 */ replace e332=e332+1 if q5b09==1
replace e332=e332+0.5 if q5b09==2
/* 7 */ replace e332=e332+1 if q5b20==1
replace e332=e332+0.5 if q5b20==2
/* 8 */ replace e332=e332+1 if q5b21==1
replace e332=e332+0.5 if q5b21==2
/* 9 */ replace e332=e332+1 if q5b22==1
replace e332=e332+0.5 if q5b22==2
/* 10 */ replace e332=e332+1 if q5b23<q5b24 & q5b23!=0 & q5b24<4
replace e332=e332+1 if q5b24==0 & q5b23==1
replace e332=e332+0.5 if q5b24==0 & q5b23==2
/* 11 */ replace e332=e332+1 if q5b25==1
replace e332=e332+0.5 if q5b25==2
/* 12 */ replace e332=e332+1 if q5b41==1
replace e332=e332+0.5 if q5b41==2
/* 13 */ replace e332=e332+1 if q5b50==1
replace e332=e332+0.5 if q5b50==2
/* 14 */ replace e332=e332+1 if q5b51==1
replace e332=e332+0.5 if q5b51==2
/* 15 */ replace e332=e332+1 if q5b60==1
replace e332=e332+0.5 if q5b60==2
/* 16 */ replace e332=e332+1 if q5b71==1
replace e332=e332+0.5 if q5b71==2
/* 17 */ replace e332=e332+1 if q5b80==1
replace e332=e332+0.5 if q5b80==2
/* 18 */ replace e332=e332+1 if q5b81==1
replace e332=e332+0.5 if q5b81==2
/* 19 */ replace e332=e332+1 if q5b90==1

```

```

replace e332=e332+0.5 if q5b90==2
/* 20 */ replace e332=e332+1 if q5b91==1
replace e332=e332+0.5 if q5b91==2
/* No q8332 */
/* Normalize */ replace e332=e332/22

/* 333 Maximize the number of people benefited */
g e333=0
la var e333 "Maximize number benefited"
/* Not just routes heavily traveled by pedestrians, since more
   people might benefit from facilities where there are none
   now. It depends. */
/* Include areas with expectations of high pedestrian use. */
/* 1 */ replace e333=e333+1 if q4a01==1 | q4a12==1
replace e333=e333+0.5 if (q4a01==2 | q4a12==2) & q4a01!=1 &
    q4a12!=1
/* 2 */ replace e333=e333+1 if q4a02==1
replace e333=e333+0.5 if q4a02==2
/* 3 */ replace e333=e333+1 if q4a03==1 | q4a13==1
replace e333=e333+0.5 if (q4a03==2 | q4a13==2) & q4a03!=1 &
    q4a13!=1
/* 4 */ replace e333=e333+1 if q4a04==1
replace e333=e333+0.5 if q4a04==2
/* 5 */ replace e333=e333+1 if q4a05==1
replace e333=e333+0.5 if q4a05==2
/* 6 */ replace e333=e333+1 if q4a06==1
replace e333=e333+0.5 if q4a06==2
/* 7 */ replace e333=e333+1 if q4a07==1 | q4a15==1
replace e333=e333+0.5 if (q4a07==2 | q4a15==2) & q4a07!=1 &
    q4a15!=1
/* 8 */ replace e333=e333+1 if q4a08==1
replace e333=e333+0.5 if q4a08==2
/* 9 */ replace e333=e333+1 if q4a09==1
replace e333=e333+0.5 if q4a09==2
/* 10 */ replace e333=e333+1 if q4a10==1 | q4a14==1
replace e333=e333+0.5 if (q4a10==2 | q4a14==2) & q4a10!=1 &
    q4a14!=1
/* 11 */ replace e333=e333+1 if q4a11==1
replace e333=e333+0.5 if q4a11==2
/* 12 */ replace e333=e333+1 if q4a22==1
replace e333=e333+0.5 if q4a22==2
/* 13 */ replace e333=e333+1 if q4a50<=q4a51 & q4a50!=0 & q4a50<4
replace e333=e333+1 if q4a51==0 & q4a50==1
replace e333=e333+0.5 if q4a51==0 & q4a50==2
/* 14 */ replace e333=e333+1 if q4a54==1
replace e333=e333+0.5 if q4a54==2
/* Also facilities for the most common disabilities */
/* 15 */ replace e333=e333+1 if q5a01==1
/* 16 */ replace e333=e333+1 if facssevereavg-facscommonbothavg>0
    & facscommonbothavg!=0
/* 17 */ replace e333=e333+1 if facssevereavg-facscommonbothavg>1
    & facscommonbothavg!=0
/* 18 */ replace e333=e333+1 if facssevereavg-facscommonbothavg>2
    & facscommonbothavg!=0

```

```

/* 19 */ replace e333=e333+1 if q7a06==1
/* 20 and 21 */ replace e333=e333+q8333
/* Normalize */ replace e333=e333/21

/* PROPORTIONAL TO NEED */

/* 410 Proportional to Need Total */
/* Not really possible to capture. */

/* 411 Proportional to total pedestrian traffic */
g e411=0
la var e411 "Proportional to total ped traffic"
/* 1 */ replace e411=e411+1 if q3a5==1
/* 2 */ replace e411=e411+1 if q3a94==1
/* 3 */ replace e411=e411+1 if q4a01==1 | q4a12==1
replace e411=e411+0.5 if (q4a01==2 | q4a12==2) & q4a01!=1 &
    q4a12!=1
/* 4 */ replace e411=e411+1 if q4a02==1
replace e411=e411+0.5 if q4a02==2
/* 5 */ replace e411=e411+1 if q4a03==1 | q4a13==1
replace e411=e411+0.5 if (q4a03==2 | q4a13==2) & q4a03!=1 &
    q4a13!=1
/* 6 */ replace e411=e411+1 if q4a04==1
replace e411=e411+0.5 if q4a04==2
/* 7 */ replace e411=e411+1 if q4a05==1
replace e411=e411+0.5 if q4a05==2
/* 8 */ replace e411=e411+1 if q4a06==1
replace e411=e411+0.5 if q4a06==2
/* 9 */ replace e411=e411+1 if q4a07==1 | q4a15==1
replace e411=e411+0.5 if (q4a07==2 | q4a15==2) & q4a07!=1 &
    q4a15!=1
/* 10 */ replace e411=e411+1 if q4a08==1
replace e411=e411+0.5 if q4a08==2
/* 11 */ replace e411=e411+1 if q4a09==1
replace e411=e411+0.5 if q4a09==2
/* 12 */ replace e411=e411+1 if q4a10==1 | q4a14==1
replace e411=e411+0.5 if (q4a10==2 | q4a14==2) & q4a10!=1 &
    q4a14!=1
/* 13 */ replace e411=e411+1 if q4a11==1
replace e411=e411+0.5 if q4a11==2
/* 14 */ replace e411=e411+1 if q4a22==1
replace e411=e411+0.5 if q4a22==2
/* 15 */ replace e411=e411+1 if q4a50<=q4a51 & q4a50!=0 & q4a50<4
replace e411=e411+1 if q4a51==0 & q4a50==1
replace e411=e411+0.5 if q4a51==0 & q4a50==2
/* 16 */ replace e411=e411+1 if q4a54==1
replace e411=e411+0.5 if q4a54==2
/* 17 and 18 */ replace e411=e411+q8411
/* Normalize */ replace e411=e411/18

/* 412 Proportional to traffic of pedestrians with disabilities
*/
g e412=0

```

```

la var e412 "Proportional to disability ped traffic"
/* 1 */ replace e412=e412+1 if q3a6==1
/* 2 */ replace e412=e412+1 if q4a02==1
replace e412=e412+0.5 if q4a02==2
/* 3 */ replace e412=e412+1 if q4a06==1
replace e412=e412+0.5 if q4a06==2
/* 4 */ replace e412=e412+1 if q4a51<q4a50 & q4a51!=0 & q4a51<4
replace e412=e412+1 if q4a50==0 & q4a51==1
replace e412=e412+0.5 if q4a50==0 & q4a51==2
/* 5 */ replace e412=e412+1 if q4a53<q4a52 & q4a53!=0 & q4a53!=4
replace e412=e412+1 if q4a52==0 & q4a53==1
replace e412=e412+0.5 if q4a52==0 & q4a53==2
/* 6 and 7 */ replace e412=e412+q8412
/* Normalize */ replace e412=e412/7

/* 413 Proportional to total population */
g e413=0
la var e413 "Proportional to total pop"
/* 1 */ replace e413=e413+1 if q3a7==1
/* 2 */ replace e413=e413+1 if q4a05==1
replace e413=e413+0.5 if q4a05==2
/* 3 */ replace e413=e413+1 if q4a06==1
replace e413=e413+0.5 if q4a06==2
/* 4 */ replace e413=e413+1 if q4a20<=q4a21 & q4a20!=0 & q4a20<4
replace e413=e413+1 if q4a21==0 & q4a20==1
replace e413=e413+0.5 if q4a21==0 & q4a20==2
/* 5 and 6 */ replace e413=e413+q8413
/* Normalize */ replace e413=e413/6

/* 414 Proportional to population of people with disabilities */
g e414=0
la var e414 "Proportional to disabilities pop"
/* 1 */ replace e414=e414+1 if q3a8==1
/* 2 */ replace e414=e414+1 if q4a06==1
replace e414=e414+0.5 if q4a06==2
/* 3 */ replace e414=e414+1 if q4a21<q4a20 & q4a21!=0 & q4a21!=4
replace e414=e414+1 if q4a20==0 & q4a21==1
replace e414=e414+0.5 if q4a20==0 & q4a21==2
/* No q8414 */
/* Normalize */ replace e414=e414/5

/* 415 Proportional to the need for safety among the general
    population */
g e415=0
la var e415 "Proportional to need for safety"
/* 1 */ replace e415=e415+1 if q4a60<q4a61 & q4a60!=0 & q4a60!=4
replace e415=e415+1 if q4a61==0 & q4a60==1
replace e415=e415+0.5 if q4a61==0 & q4a60==2
/* 2 */ replace e415=e415+1 if q4a62==1
replace e415=e415+0.5 if q4a62==2
/* 3 */ replace e415=e415+1 if q4a63==1
replace e415=e415+0.5 if q4a63==2
/* 4 */ replace e415=e415+1 if q5a31==1
/* 5 */ replace e415=e415+1 if q5b22==1

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```

replace e415=e415+0.5 if q5b22==2
/* 6 */ replace e415=e415+1 if q5b40==1
replace e415=e415+0.5 if q5b40==2
/* 7 */ replace e415=e415+1 if q5b41==1
replace e415=e415+0.5 if q5b41==2
/* 8 */ replace e415=e415+1 if q5b42==1
replace e415=e415+0.5 if q5b42==2
/* 9 */ replace e415=e415+1 if q5b43==1
replace e415=e415+0.5 if q5b43==2
/* 10 */ replace e415=e415+1 if q5b50==1
replace e415=e415+0.5 if q5b50==2
/* 11 */ replace e415=e415+1 if q5b51==1 | q5b52==1
replace e415=e415+0.5 if (q5b51==2 | q5b52==2) & q5b51!=1 &
    q5b52!=1
/* 12 */ replace e415=e415+1 if q5b53==1
replace e415=e415+0.5 if q5b53==2
/* 13 */ replace e415=e415+1 if q5b54==1
replace e415=e415+0.5 if q5b54==2
/* 14 */ replace e415=e415+1 if q7a07==1
/* 15 and 16 */ replace e415=e415+q8415
/* Normalize */ replace e415=e415/16

/* 416 Proportional to the need for physical activity
among the general population */
g e416=0
la var e416 "Proportional to need for exercise"
/* 1 */ replace e416=e416+1 if q4a25<q4a26 & q4a25!=0 & q4a25!=4
replace e416=e416+1 if q4a26==0 & q4a25==1
replace e416=e416+0.5 if q4a26==0 & q4a25==2
/* 2 */ replace e416=e416+1 if q4a29==1
replace e416=e416+0.5 if q4a29==2
/* No q8416 */
/* Normalize */ replace e416=e416/4

/* 417 Proportional to severity of disability */
g e417=0
la var e417 "Proportional to severity of disability"
/* 1 */ replace e417=e417+1 if q4a27<q4a28 & q4a27!=0 & q4a27!=4
replace e417=e417+1 if q4a28==0 & q4a27==1
replace e417=e417+0.5 if q4a28==0 & q4a27==2
/* 2 */ replace e417=e417+1 if q5a02==1
/* 3 */ replace e417=e417+1 if facscommonavg-facsseverebothavg>0
    & facsseverebothavg!=0
/* 4 */ replace e417=e417+1 if facscommonavg-facsseverebothavg>1
    & facsseverebothavg!=0
/* 5 */ replace e417=e417+1 if facscommonavg-facsseverebothavg>2
    & facsseverebothavg!=0
/* 6 */ replace e417=e417+1 if q5c1==1
/* 7 and 8 */ replace e417=e417+q8417
/* Normalize */ replace e417=e417/8

/* PROPORTIONAL TO DEMONSTRATED USE */

```

```

/* 420 Proportional to Demonstrated Use */
/* As a total, this would conceptually most likely be the same as
   422. */

/* 421 Provide facilities in proportion to the demonstrated use
   by people who specifically benefit from those facilities */
/* Not possible to distinguish from 423, unless I use answers to
   Q5b. But in order to use answers to Q5b, I would have to
   also have data on how much different people used those
   facilities in those cities. But since I do not have that
   use data, I cannot further answer this question. */
/* No q8421 */

/* 422 Proportional to demonstrated total pedestrian traffic */
g e422=0
la var e422 "Proportional to demonstrated total ped traffic"
/* 1 */ replace e422=e422+1 if q3a5==1
/* 2 */ replace e422=e422+1 if q3a94==1
/* 3 */ replace e422=e422+1 if q4a50<=q4a51 & q4a50!=0 & q4a50<4
replace e422=e422+1 if q4a51==0 & q4a50==1
replace e422=e422+0.5 if q4a51==0 & q4a50==2
/* 4 */ replace e422=e422+1 if q6a2==1
replace e422=e422+0.5 if q6a2==2
/* 5 */ replace e422=e422+1 if q6a1==1 & q6a2<=q6a1 & q6a2!=0
replace e422=e422+0.5 if q6a1==2 & q6a2<=q6a1 & q6a2!=0 /* No
   points for when q6a2=0 */
/* 6 */ replace e422=e422+1 if q7a06==1
/* 7 and 8 */ replace e422=e422+q8422
/* Normalize */ replace e422=e422/8

/* 423 Proportional to demonstrated traffic of pedestrians with
   disabilities in general */
g e423=0
la var e423 "Proportional to demonstrated disabilities ped
   traffic"
/* 1 */ replace e423=e423+1 if q3a6==1
/* 2 */ replace e423=e423+1 if q4a51<q4a50 & q4a51!=0 & q4a51<4
replace e423=e423+1 if q4a50==0 & q4a51==1
replace e423=e423+0.5 if q4a50==0 & q4a51==2
/* 3 */ replace e423=e423+1 if q4a53<q4a52 & q4a53!=0 & q4a53!=4
replace e423=e423+1 if q4a52==0 & q4a53==1
replace e423=e423+0.5 if q4a52==0 & q4a53==2
/* 4 */ replace e423=e423+1 if q7a06==1
/* No q8423 */
/* Normalize */ replace e423=e423/6

/* PROPORTIONAL TO PREFERENCES */

/* 430 Total = 431 */

/* 431 Prioritize improvements as identified from public outreach
   */
g e431=0

```

```

la var e431 "Prioritize by public outreach"
/* 1 */ replace e431=e431+1 if q4a71==1
replace e431=e431+0.5 if q4a71==2
/* 2 */ replace e431=e431+1 if q4a72==1
replace e431=e431+0.5 if q4a72==2
/* 3 */ replace e431=e431+1 if q5a11==1
/* 4 and 5 */ replace e431=e431+q8431
/* Normalize */ replace e431=e431/5

/* PROPORTIONAL TO ADVOCACY */

/* 440 Total = 441 */

/* 441 Prioritize improvements as requested by individuals,
    advocacy groups, and advisory boards */
g e441=0
la var e441 "Prioritize by request"
/* 1 */ replace e441=e441+1 if q4a70==1
replace e441=e441+0.5 if q4a70==2
/* 2 */ replace e441=e441+1 if q4a72==1
replace e441=e441+0.5 if q4a72==2
/* 3 */ replace e441=e441+1 if q4a73==1
replace e441=e441+0.5 if q4a73==2
/* 4 */ replace e441=e441+1 if q5a10==1
/* 5 */ replace e441=e441+1 if q5a12==1
/* 6 */ replace e441=e441+1 if q7a08==1
/* 7 */ replace e441=e441+1 if q7a09==1
/* 8 and 9 */ replace e441=e441+q8441
/* Normalize */ replace e441=e441/9

/* PROPORTIONAL TO CONTRIBUTION */

/* 450 Proportional to Contribution Total */
/* Not really possible to capture. */

/* 451 Proportional in each district to tax contributions from
    that district */
g e451=0
la var e451 "Proportional to tax contribution"
/* 1 */ replace e451=e451+1 if q4a09==1
replace e451=e451+0.5 if q4a09==2
/* 2 */ replace e451=e451+1 if q4a10==1
replace e451=e451+0.5 if q4a10==2
/* 3 */ replace e451=e451+1 if q4a22==1
replace e451=e451+0.5 if q4a22==2
/* 4 */ replace e451=e451+1 if q4a23>q4a24 & q4a24!=0 & q4a24!=4
replace e451=e451+1 if q4a23==0 & q4a24==1
replace e451=e451+0.5 if q4a23==0 & q4a24==2
/* No q8451 */
/* Normalize */ replace e451=e451/6

```

```

/* 452 Proportional in each location to coproduction
contributions for that location */
g e452=0
la var e452 "Proportional to coproduction contribution"
/* 1 */ replace e452=e452+1 if q2==1
replace e452=e452+.5 if q2==3
/* 2 */ replace e452=e452+1 if q3a93==1
/* 3 */ replace e452=e452+1 if q4a90<q4a91 & q4a90!=0 & q4a90!=4
replace e452=e452+1 if q4a91==0 & q4a90==1
replace e452=e452+0.5 if q4a91==0 & q4a90==2
/* 4 and 5 */ replace e452=e452+q8452
/* Normalize */ replace e452=e452/5

/* COST EFFICIENCY */

/* 510 Cost Efficiency Total */
g e510=0
la var e510 "Cost Efficiency Total"
/* 1 */ replace e510=e510+1 if q4a27==1 | q4a28==1
replace e510=e510+0.5 if (q4a27==2 | q4a28==2) & q4a27!=1 &
q4a28!=1
/* 2 */ replace e510=e510+1 if q4a80==1 | q4a81==1
replace e510=e510+0.5 if (q4a80==2 | q4a81==2) & q4a80!=1 &
q4a81!=1
/* 3 */ replace e510=e510+1 if q5a20==1 | q5a21==1
/* 4 and 5 */ replace e510=e510+q8510
/* Normalize */ replace e510=e510/5

/* 511 Prioritize the least costly of adequate improvements */
g e511=0
la var e511 "Cost Efficiency falling costs"
/* 1 */ replace e511=e511+1 if q4a27>q4a28 & q4a28!=0 & q4a28!=4
replace e511=e511+1 if q4a27==0 & q4a28==1
replace e511=e511+0.5 if q4a27==0 & q4a28==2
/* 2 */ replace e511=e511+1 if q4a80>q4a81 & q4a81!=0 & q4a81!=4
replace e511=e511+1 if q4a80==0 & q4a81==1
replace e511=e511+0.5 if q4a80==0 & q4a81==2
/* 3 */ replace e511=e511+1 if q5a21==1
/* 4 */ replace e511=e511+1 if q6a4<((q6a1+q6a2+q6a3)/3) &
q6a4!=0 & q6a4<4 & q6a1!=0 & q6a2!=0 & q6a3!=0
replace e511=e511+1 if q6a4<((q6a2+q6a3)/2) & q6a4!=0 & q6a4<4 &
q6a1==0 & q6a2!=0 & q6a3!=0
replace e511=e511+1 if q6a4<((q6a1+q6a3)/2) & q6a4!=0 & q6a4<4 &
q6a1!=0 & q6a2==0 & q6a3!=0
replace e511=e511+1 if q6a4<((q6a1+q6a2)/2) & q6a4!=0 & q6a4<4 &
q6a1!=0 & q6a2!=0 & q6a3==0
replace e511=e511+1 if q6a4<q6a1 & q6a4!=0 & q6a4<4 & q6a2==0 &
q6a3==0
replace e511=e511+1 if q6a4<q6a2 & q6a4!=0 & q6a4<4 & q6a1==0 &
q6a3==0
replace e511=e511+1 if q6a4<q6a3 & q6a4!=0 & q6a4<4 & q6a1==0 &
q6a2==0
/* 5 and 6 */ replace e511=e511+q8511

```

```

/* Normalize */ replace e511=e511/6

/* 512 Prioritize the most costly of committed improvements */
g e512=0
la var e512 "Cost Efficiency rising costs"
/* 1 */ replace e512=e512+1 if q4a27<q4a28 & q4a27!=0 & q4a27!=4
replace e512=e512+1 if q4a28==0 & q4a27==1
replace e512=e512+0.5 if q4a28==0 & q4a27==2
/* 2 */ replace e512=e512+1 if q4a80<q4a81 & q4a80!=0 & q4a80!=4
replace e512=e512+1 if q4a81==0 & q4a80==1
replace e512=e512+0.5 if q4a81==0 & q4a80==2
/* 3 */ replace e512=e512+1 if q5a20==1
/* 4 */ replace e512=e512+1 if (q6a1+q6a2)<(q6a3+q6a4) & q6a1!=0
    & q6a2!=0 & q6a1<4 & q6a2<4
replace e512=e512+1 if ((q6a1+q6a2)/2)<q6a3 & q6a1!=0 & q6a2!=0 &
    q6a1<4 & q6a2<4 & q6a4==0
replace e512=e512+1 if ((q6a1+q6a2)/2)<q6a4 & q6a1!=0 & q6a2!=0 &
    q6a1<4 & q6a2<4 & q6a3==0
replace e512=e512+1 if q6a1<((q6a3+q6a4)/2) & q6a1!=0 & q6a2==0 &
    q6a1<4
replace e512=e512+1 if q6a2<((q6a3+q6a4)/2) & q6a1==0 & q6a2!=0 &
    q6a2<4
replace e512=e512+1 if q6a1<q6a3 & q6a1!=0 & q6a2==0 & q6a1<4 &
    q6a4==0
replace e512=e512+1 if q6a1<q6a4 & q6a1!=0 & q6a2==0 & q6a1<4 &
    q6a3==0
replace e512=e512+1 if q6a2<q6a3 & q6a1==0 & q6a2!=0 & q6a2<4 &
    q6a4==0
replace e512=e512+1 if q6a2<q6a4 & q6a1==0 & q6a2!=0 & q6a2<4 &
    q6a3==0
/* No q8512 */
/* Normalize */ replace e512=e512/6

/* OPERATIONAL EFFICIENCY */

/* 521 Coordinate improvements with existing project schedules */
g e521=0
la var e521 "Coordinate with other projects"
/* 1 */ replace e521=e521+1 if q3a92==1
/* 2 */ replace e521=e521+1 if q4a40==1
replace e521=e521+0.5 if q4a40==2
/* 3 */ replace e521=e521+1 if q4a41==1
replace e521=e521+0.5 if q4a41==2
/* 4 */ replace e521=e521+1 if q4a42==1
replace e521=e521+0.5 if q4a42==2
/* 5 */ replace e521=e521+1 if q4a74==1
replace e521=e521+0.5 if q4a74==2
/* 6 */ replace e521=e521+1 if q4a91<q4a90 & q4a91!=0 & q4a91!=4
replace e521=e521+1 if q4a90==0 & q4a91==1
replace e521=e521+0.5 if q4a90==0 & q4a91==2
/* 7 */ replace e521=e521+1 if q4a92==1
replace e521=e521+0.5 if q4a92==2
/* 8 */ replace e521=e521+1 if q5a30==1

```

```

/* 9 */ replace e521=e521+1 if q6a4==1
replace e521=e521+0.5 if q6a4==2
/* 10 and 11 */ replace e521=e521+q8521
/* Normalize */ replace e521=e521/11

/* 522 Prioritize improvements eligible for outside funding */
g e522=0
la var e522 "Prioritize outside funding"
/* 1 */ replace e522=e522+1 if q2==1
/* 2 */ replace e522=e522+1 if q3a93==1
/* 3 */ replace e522=e522+1 if q4a82==1
replace e522=e522+0.5 if q4a82==2
/* 4 */ replace e522=e522+1 if q4a90<q4a91 & q4a90!=0 & q4a90!=4
replace e522=e522+1 if q4a91==0 & q4a90==1
replace e522=e522+0.5 if q4a91==0 & q4a90==2
/* 5 */ replace e522=e511+1 if q5a22==1
/* 6 and 7 */ replace e522=e522+q8522
/* Normalize */ replace e522=e522/7

/* 523 Minimize the potential of costly legal action
against the local government */
g e523=0
la var e523 "Minimize legal action"
/* 1 */ replace e523=e523+1 if q4a73==1
replace e523=e523+0.5 if q4a73==2
/* 2 */ replace e523=e523+1 if q4a83==1
replace e523=e523+0.5 if q4a83==2
/* 3 */ replace e523=e523+1 if q7a08==1
/* 4 and 5 */ replace e523=e523+q8523
/* Normalize */ replace e523=e523/5

/* 524 Alternate Priority: prioritizing pedestrian transportation
mode */
g e524=0
la var e524 "Prioritize ped transport mode"
/* 1 */ replace e524=e524+1 if q4a25<q4a26 & q4a25!=0 & q4a25!=4
replace e524=e524+1 if q4a26==0 & q4a25==1
replace e524=e524+0.5 if q4a26==0 & q4a25==2
/* 2 and 3 */ replace e524=e524+q8524
/* Normalize */ replace e524=e524/3

save Survey2.dta, replace

```

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