The Growing Transit Communities partnership is creating a typology tool to help guide policies and investments that support equitable transit communities throughout the Puget Sound Region. This typology will offer a regional framework for prioritizing and coordinating strategies to maximize opportunities for households of all incomes to live near transit, and ensuring transit communities achieve a range of outcomes including increased transit use, transportation choices for families, and reduced household spending on transportation.

The Center for Transit-Oriented Development (CTOD) has been working with PSRC staff since March 2012 to offer recommendations on how the typology might be most effectively structured and used to inform equitable transit community strategies in the Puget Sound region. In June 2012, CTOD facilitated a working group of Growing Transit Communities stakeholders - including representatives from each task force and steering committee – to identify goals for the typology, brainstorm activities and implementation strategies that the typology could potentially inform, and discuss possible approaches to developing a data-driven framework that would inform these activities.

Following these activities, this memorandum summarizes CTOD’s recommendations for completion of the typology tool. It includes recommendations for approaches to structure the typology in a way that will inform decisions around connectivity and access enhancements, catalytic development, neighborhood stabilization and prevention of displacement, production of affordable housing, and enhancements to opportunities in neighborhoods with transit.

**EXAMPLES FROM OTHER REGIONS, AND LESSONS LEARNED**

The typology tool has been applied in regions across the country to provide a regional framework for investments in transit communities. It is not designed to supplant local or citywide initiatives such as station area planning or zoning, but offers guidance on understanding implementation needs across an entire fixed-guideway (light rail / bus rapid transit) system, prioritizing regional resources, and coordinating the many actors who are responsible for implementation of successful, equitable transit communities.

Not all investments make sense for every neighborhood. For example, a heavily disinvested community may not benefit as much from investment in affordable housing, as it would
from investment in civic amenities such as parks, streetscape improvements, or schools. A gentrifying neighborhood may have a more urgent need for affordable housing preservation. Classifying study areas in a series of implementation types helps to differentiate between unique kinds of places, and coordinate appropriate sets of investments for each place.

The Central Maryland TOD Strategy: Coordinating a Range of Actors

The Central Maryland TOD Strategy evaluated Baltimore’s existing transit system and long-range expansion plans. CTOD used both existing and new data analysis to characterize the region’s job centers and neighborhoods based on their demographic, market, and economic performance as well as their existing walkability and transit orientation. This information was presented and discussed through semi-weekly meetings with a broad range of City, County, and community-based partners who participated in the Central Maryland Transportation Alliance. Ultimately, the process resulted in a published strategy and typology that walked the many different actors who participate in TOD – including private and affordable housing developers, city planners, economic development staff, and state transit planners – through the set of investment strategies that made sense to them. The intention of the plan was to create a more orderly process for determining where public investments made sense, so that investment could be made in a proactive and coordinated, rather than reactive and dispersed way.

Perhaps more so than the plan itself, the process of developing the plan helped the wide range of public and private partners at the table engage in a conversation about their unique and shared roles in implementing transit-oriented development. As a result, the City and County have a better understanding of the State’s capacity to support TOD; the advocacy community knows when and how to engage in station area and project-based initiatives in different communities; and actors implement TOD from the same “playbook.”

The Portland Metro TOD Strategic Plan: Prioritizing Regional Funds

Metro, the Portland, OR region Metropolitan Planning Organization, supports a Transit-Oriented Development Program that invests in market rate and affordable development projects in regional transit areas and centers to catalyze land use change in support of the 2040 Growth Concept goals. Because the program is focused on catalytic development, program goals are best achieved in areas meeting certain physical and economic characteristics. If a transit area has a market that is too strong, the program’s investments would not be effectively catalyzing the market. Conversely if a transit area has a market that is too weak, there may not be enough market potential for other private development projects to follow suit. Likewise a minimum level of supportive urban form is needed to ensure nearby residents and workers are actually able to walk, bike, and take transit more often, thus reducing vehicle miles traveled and greenhouse gas emissions.

To identify transit areas meeting these specific characteristics, TOD Program staff worked with CTOD to develop a data driven TOD typology. The resulting typology sorts station areas and high capacity transit corridors into nine place types, which are then grouped into three high level categories: infill and enhance; catalyze and connect; and monitor and respond. While the TOD Program investments are most appropriate in catalyze and connect areas, the accompanying TOD Strategic Plan also identifies other types of investments that can support TOD in the “monitor and respond,” and “infill and enhance” categories.
Lessons Learned from Examples
While both the Central Maryland and Portland examples use typologies as a component of a regional TOD strategic plan, their purposes and the way they were developed are quite different. Nonetheless there are some lessons for the Growing Transit Communities typology in these examples:

- **Identify goals and the activities to be informed.** Both typologies had specific activities they were trying to influence, and the data and information used to classify station areas was driven by these activities.

- **Focus on activities that can be effectively prioritized or coordinated at the regional scale.** Many transit community implementation activities will need to occur on a station-by-station or project-by-project basis. Focus on activities involving allocation of regional funds, or coordination of actors to focus on a limited number of stations. For example, regional transportation funding for station area planning might be an appropriate focus of the typology, but station area planning itself is not an appropriate activity for the typology.

- **Keep it simple.** The typology has to be understandable in order to garner support from the range of actors responsible for implementing transit communities. “Black box” approaches can draw skepticism at worst, or apathy at best, from parties not involved in the development of the typology.

OVERALL TYPOLOGY RECOMMENDATION
The overarching goal of the Growing Transit Communities partnership is to foster equitable transit communities that may 1) accommodate more of the region’s residential and employment growth near transit, and 2) grow in ways that are equitable to both existing and future community members. To achieve these goals, local partners will continue to make investments in connectivity and access enhancements, catalytic development, neighborhood stabilization and prevention of displacement, production of affordable housing, and improved educational, health, economic, and neighborhood opportunities. In the June 2012 work session, Growing Transit Communities representatives confirmed that the typology should consider how to prioritize regional investments in all of the above categories.

Because the range of implementation activities is so broad, CTOD recommends a two-part typology that addresses “place,” or physical investments (urban form enhancements, catalytic development, land use) separately from “people,” or equitable investments (affordable housing, community development, enhancement of opportunities, workforce development and job / business creation). Because some study areas may be a high priority for one type of investment but not another, this approach allows the typology to give equal weight to both the physical and demographic aspects of equitable transit communities. Following the creation of these two separate parts of the typology, the two parts can be reconciled. For example, placing the results side by side will give a sense of how neighborhoods vulnerable to displacement fare when it comes to the prioritization of urban form improvements, and may change the way study areas are prioritized.

**Figure 1**, below, provides an overview of how this two-part approach might look:
• The “People” profile will sort study areas based on need for affordable housing, community development, health, education, and other investments by evaluating the demographic composition of existing study area residents over the last decade, and the opportunities provided to these residents using the Kirwan Institute’s Regional Geography of Opportunity mapping work.

• The “Place” profile will sort study areas based on need for pedestrian and bicycle improvements, catalytic development to spur growth in places that will reduce regional congestion and vehicle miles traveled, and other connectivity enhancements to increase transportation choices for both existing and future residents. This will be done by evaluating the current urban form and market strength of each study area.

• The integration of these two profiles will provide a high-level framework that can help identify short-, mid-, and long-term priority study areas for both types of strategies, and determine whether there are implications if a study area is a short-term priority for one activity but a long term priority for the other.

Both the “People” and “Place” profiles will have two axes – the Y-axis measures current infrastructure in a given study area that supports equitable transit communities, while the X-axis measures the potential for change to occur. In the “People” profile this translates to social infrastructure on the Y-Axis, or health, education, housing, and amenities offered to existing residents and businesses. The X-Axis measures the extent to which the profile of existing community members is susceptible to change. In the “Place” profile this translates to physical infrastructure on the Y-Axis, or urban form, land use, and transit connections offered to existing residents and businesses. The X-Axis measures the extent to which new development, land use change, and infrastructure investments are likely based on market strength.

The following sections describe CTOD’s recommendations for the data and approach to be used to create these profiles. For all measures and indices, we recommend that staff conduct some initial trials to test their sensitivity and accuracy.
PART I: PEOPLE

The “People” profile will focus on preparing for the potential impacts of rail transit expansion and new development on existing people living and working in study areas. This profile will evaluate demographic characteristics including neighborhood change (described below as the “neighborhood change” axis), overlaid with the economic, health, educational, and other opportunities provided in the study areas (described below as the “opportunity” axis).

The X-Axis: Neighborhood Change

CTOD recommends that the Neighborhood Change axis evaluate study areas based on both current demographic and market conditions, as well as change over time. Neighborhood change was a facet of the Central Maryland TOD Strategy. The approach used to evaluate and classify station areas in that typology was based on the framework created by the Center for Community Innovation at the University of California, Berkeley, in its report, Mapping Susceptibility to Gentrification: The Early Warning Toolkit.¹

Based on the indicators outlined in the report (and again below), the Central Maryland TOD Strategy grouped station areas into seven neighborhood change categories:

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¹ Available at [http://communityinnovation.berkeley.edu/publications.html](http://communityinnovation.berkeley.edu/publications.html)
Changing Neighborhoods

- Gentrifying: In these places, incomes are increasing but income diversity may be either increasing or decreasing. Because data on whether actual lower income households are being displaced is difficult to come by at the regional scale, increases in income could be either because new higher income households are moving into new development, because existing households are becoming higher income, or because new higher income households are moving into existing housing and displacing lower income households. Evaluating additional characteristics such as changes in educational attainment and changes in the share of nonfamily households can provide a more comprehensive picture of what is happening in these places. However, in any case, lower income, high renter neighborhoods that have experienced a change in demographics over the last decade should be monitored closely, and intervention could be a high priority in these places.

- Polarizing: Places that are polarizing may not be gentrifying but there is some likelihood that these places could over time. For example, areas where one low income neighborhood is geographically adjacent to a high income neighborhood but physically somehow divided (i.e. by a major road, railroad tracks, topography) would potentially show up with an average household income, when the reality is there are low and high pockets. However, if these polarized locations are near transit, there is some likelihood that they may begin to gentrify over time, and low-income residents may be displaced. Polarized neighborhoods will show an increase in incomes, but a decrease in income diversity. As with gentrifying neighborhoods, intervention could be a high priority in these places to prevent future displacement of vulnerable, low income residents or businesses.

- Disinvesting: These are places that are becoming lower income and whose indicators show a weakening of the market for housing or commercial uses. Disinvesting places may have growing foreclosure rates, increasing vacancies, and increases in abandonment altogether. While this category was of critical importance in Baltimore, where some neighborhoods were nearing the “tipping point” of disinvestment and in need of significant intervention, this neighborhood type may not be as significant for the Puget Sound region.

Stable Neighborhoods

- Stable Higher Income: Generally, stable higher income neighborhoods are not experiencing significant change and may not be high priorities for community development interventions. However, these could be places to consider new affordable housing development as they may also be opportunity rich. The opportunity axis will provide further clarity on this issue.

- Stable Middle Income: Stable middle income neighborhoods are also not likely to be high priorities for intervention. However, these neighborhoods should be regularly monitored as a middle income or mixed-income neighborhood could potentially tip into one of the changing categories.

- Stable Mixed-Income: These neighborhoods should be regularly monitored as a middle income or mixed-income neighborhood could potentially tip into one of the changing categories.

- Stable Lower Income: Stable lower income neighborhoods should be monitored, and it may be worth prioritizing some of these neighborhoods if they are in need of interventions due to availability of opportunities. The opportunity axis will be especially important to consider in prioritizing stable lower income neighborhoods.
Data
The above categories were defined using a wide range of data including:

- Median Income (change and current): Existing median household income based on the 2006-2010 American Community Survey, and change in income over time. Note that given issues with the sample size, change in income since 2000 should be evaluated to determine if there are issues with statistical significance. It may be worth “ground-truthing” study areas showing any major change in demographics with local experts.

- Income Diversity (change and current): Income diversity is measured using an entropy index approach that shows how well households are distributed across different income categories. In the past, CTOD has used 5 income “bins” to do this analysis: less than $25,000; $25,000 to $34,999; $35,000 to $49,999; $50,000 to $74,999; and $75,000 or greater. The entropy index provides a score between 0 and 1, where 0 denotes that there is no income diversity, and 1 denotes that a place has an equal distribution of households across all five of the bins. Because of this indexed approach, income diversity is best evaluated in comparison with other places, or other points in time. For example, it may be best to look at change in income diversity from 2000 to 2010. If the index moves from a larger to smaller number, the place has become less diverse.

- Family Structure (change): CTOD has evaluated the change in the share of nonfamily households in a given area. Together with change in income and educational attainment, this measure can show whether a place is becoming more nonfamily, which can be an indicator of either gentrification (if an overall increase in households has occurred) or displacement (if the number of households has stayed the same, but the family structure has changed to include more nonfamily households).

- Educational Attainment (change): CTOD has evaluated the change in the share of residents with a Bachelor’s degree or higher in a given area. Together with change in income and family structure, this measure can show whether a place is becoming more highly educated, which can be an indicator of either gentrification (if an overall increase in residents has occurred) or displacement (if the number of residents has stayed the same, but educational attainment has changed to include more residents with a Bachelor’s degree).

- Tenure: Areas with a high share of renter-occupied households may be more vulnerable to displacement than areas that are mostly owner-occupied. This indicator can be looked at both in the most recent year to indicate future vulnerability, and as change over time to indicate whether a place is becoming more or less renter occupied.

- Market strength: while market strength will also be evaluated in the “Places” profile, market strength in the neighborhood change axis will provide a greater indicator of whether change is likely to occur in the future. A low income neighborhood scoring low (or cool) on the residential market strength index that Strategic Economics has recently completed may be in need of less intervention than a low income neighborhood scoring medium (emerging) or high (warm) on the market strength index.

Rather than applying a single combined index of these data points across these categories, the data points function as flags or indicators of whether a neighborhood falls into a given category. Some of the data points are important for identifying study areas as some neighborhood types, while other data points are important for other neighborhood types.

Figure 2 shows how these data points might be considered.
Figure 2: Data Indicators to Parse Study Areas by Neighborhood Change

<table>
<thead>
<tr>
<th>Demographic Types (Baltimore)</th>
<th>Change in Median Income</th>
<th>Change in Income Diversity</th>
<th>Change in % With BA</th>
<th>Change in % Nonfamily HH</th>
<th>Current Median Income</th>
<th>Current Income Diversity</th>
<th>% Renters</th>
<th>Market Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentrifying (changing)</td>
<td>Increase</td>
<td>Stable or Increase</td>
<td>Increase</td>
<td>Increase</td>
<td>Low / Average</td>
<td>Moderate - High</td>
<td>High</td>
<td>Emerging/Strong</td>
</tr>
<tr>
<td>Polarizing (changing)</td>
<td>Any</td>
<td>Decrease</td>
<td>Any</td>
<td>Any</td>
<td>Any</td>
<td>Low - Moderate</td>
<td>High</td>
<td>Emerging/Strong</td>
</tr>
<tr>
<td>Disinvesting (changing)</td>
<td>Decrease</td>
<td>Any</td>
<td>Decrease</td>
<td>Any</td>
<td>Low / Average</td>
<td>Any</td>
<td>Any</td>
<td>Cool</td>
</tr>
<tr>
<td>Stable Higher Income</td>
<td>Stable or Increase</td>
<td>Any</td>
<td>Any</td>
<td>Any</td>
<td>High</td>
<td>Low</td>
<td>Any</td>
<td>Strong</td>
</tr>
<tr>
<td>Stable Middle Income</td>
<td>Stable</td>
<td>Stable</td>
<td>Stable</td>
<td>Stable</td>
<td>Average</td>
<td>Low</td>
<td>Any</td>
<td>Any</td>
</tr>
<tr>
<td>Stable Lower Income</td>
<td>Stable</td>
<td>Stable</td>
<td>Stable</td>
<td>Stable</td>
<td>Low</td>
<td>Low</td>
<td>Any</td>
<td>Cool</td>
</tr>
<tr>
<td>Stable Mixed-Income</td>
<td>Stable</td>
<td>Increase or Stable</td>
<td>Stable</td>
<td>Stable</td>
<td>Average</td>
<td>Moderate to High</td>
<td>Any</td>
<td>Cool</td>
</tr>
</tbody>
</table>
These neighborhood types broadly tell us whether a neighborhood's demographics are changing or stable, and the current income profile of that neighborhood.

Given the many dimensions being evaluated in the Growing Transit Communities typology, CTOD recommends grouping several of the above categories in order to create fewer place types. CTOD recommends limiting the number of categories on this axis to no more than 3 or 4. One suggestion for combining the above categories is to consider how implementation strategies might vary from type to type. If strategies do not significantly vary, categories may be combined. Figure 3 shows one recommended way to collapse the place types into four categories. Based on how the study areas perform when the data is evaluated, it might make sense to eliminate the disinvesting category or combine it with another category.

**Figure 3: Reconciling Neighborhood Change Types into Four Categories**

<table>
<thead>
<tr>
<th>Demographic Types (Baltimore)</th>
<th>Collapsed Demographic Types</th>
<th>Overview of Implementation Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentrifying (changing)</td>
<td>Changing Low or Average Income</td>
<td>High priority neighborhood stabilization through affordable housing production / housing or small business preservation</td>
</tr>
<tr>
<td>Polarizing (changing)</td>
<td>Changing Low or Average Income</td>
<td>High Priority neighborhood revitalization through catalytic development (affordable, mixed, or market rate), other interventions</td>
</tr>
<tr>
<td>Disinvesting (changing)</td>
<td>Disinvesting</td>
<td>High Priority neighborhood revitalization through catalytic development (affordable, mixed, or market rate), other interventions</td>
</tr>
<tr>
<td>Stable Higher Income</td>
<td>Stable Average or High Income</td>
<td>Affordable housing production</td>
</tr>
<tr>
<td>Stable Middle Income</td>
<td>Stable Average or High Income</td>
<td>Affordable housing production</td>
</tr>
<tr>
<td>Stable Lower Income</td>
<td>Stable Low or Mixed-Income</td>
<td>Monitor and respond</td>
</tr>
<tr>
<td>Stable Mixed-Income</td>
<td>Stable Low or Mixed-Income</td>
<td>Monitor and respond</td>
</tr>
</tbody>
</table>

**The Y-Axis: Opportunity**

The Kirwan Insitute’s analysis of opportunity in the Puget Sound region provides a unique and multifaceted lens for considering inequity across different neighborhoods. The analysis considers the following broad dimensions:
- Education
- Economic Health
- Housing and Neighborhood Quality
- Mobility and Transportation
- Health and Environment
The level of detail involved in understanding how study areas perform on individual dimensions is incompatible with the regional approach taken with the typology. However, in taking a closer look at the Kirwan Institute’s analysis, it appears that broadly, areas that are high opportunity on one factor tend to be high opportunity on most other factors, and vice versa. There are a few exceptions to this such as food access, which is more diverse.

CTOD recommends that the typology consider the comprehensive Opportunity Index for the purposes of the typology. Areas scoring low on the opportunity index can then be evaluated on a study area-by-study area scale using radar graphs as shown in the “5 P’s” description in the next section, to determine which interventions are most needed to increase opportunity.

Depending on how study areas fall along the index, CTOD recommends Opportunity to be divided into a low and high category.

**The “People” Profile: Combining Neighborhood Change and Opportunity**

**Figure 4** shows how the 3-4 neighborhood change categories and the two opportunity categories can overlay to inform prioritization of study areas for affordable housing, community development, enhancement of opportunities, and continued monitoring. Darker shades of green provide a preliminary indication of types with more immediate or urgent needs for investment. The text in the People profile types is just an example of how this data might be interpreted to inform policy decisions. CTOD recommends that the Affordable Housing and Equity Network Steering Committees work with the Corridor Task Forces to expand this discussion of possible strategies based on the actual classification of study areas into these categories.
Figure 4: Overlay of Neighborhood Change and Opportunity Into Eight Types

- **Stable Average or High Income**
  - Unchanging neighborhood with high opportunity: consider affordable housing production

- **Stable Low or Mixed Income**
  - Unchanging neighborhood with low opportunity: closely monitor for potential displacement

- **Disinvesting**
  - Changing neighborhood with high opportunity: affordable and mixed-income housing production to stabilize

- **Gentrifying or Polarizing**
  - Changing neighborhood with low opportunity: revitalization by increasing opportunity investments

  - Changing neighborhood with high opportunity: immediate need for affordable housing and neighborhood access
PART II: PLACE

The second of the two components in the proposed typology is “Place”, a merged measure of a study area transit orientation index and relative market strength. Whereas the former is intended to generate transit ridership today, the latter is likely to increase future ridership through new development. While existing transit orientation capitalizes on existing urban assets, market strength captures future urban potential. A description of how the transit orientation score could be developed and overlaid with Strategic Economics’ market indices is also outlined below.

Transit Orientation Score: Mobility + Activity
A place’s transit orientation cannot be distilled to a single factor. It is the function of a number of interworking mobility and activity characteristics. Thus, it is recommended that the typology includes a composite transit orientation index that captures a blend of existing physical characteristics likely to generate transit ridership and walking and biking trips. The composite index, or transit orientation score, should include elements of the built environment with a demonstrable relationship to increased levels of active transportation use in the region including residential and employment densities, mix of uses, block sizes and pedestrian/bicycle facilities. For purposes of transparency and consistency, the chosen elements should be readily understood and available for ongoing analysis into the future as conditions change.

The 3 D’s of Transit Oriented Development
Over the past two decades, a great deal of attention has been placed and focused on the promotion of TOD throughout cities and regions across the country. Quantifying and relating components of TOD to actual transit performance, on the other hand, are less common. Fewer planning efforts have attempted to define and analyze TOD by on-the-ground elements of urban form and activity. As a result, they often focus on fostering TOD at great public and private cost on large greenfield and brownfield sites, thereby missing opportunities to promote more cost effective infill and access enhancements in station areas and corridors that are already performing well. By analyzing urban form and its relationship to transit performance and, ultimately, building an implementation typology around it, the Puget Sound region is in position to focus regional activities and optimize its existing assets.

Traditionally, the presence of TOD conditions has been evaluated using the 3 D’s of density, diversity, and design. The simplest “D” to visualize and calculate, density, is usually measured in terms of housing units or population per acre. Given the strong relationship between employment and transit ridership, it has become more common to incorporate jobs or firms per acre. Diversity is some metric of the mix of land uses within a station area. The reasoning here is that a blend of neighborhood serving retail and services can attract transit ridership while also fostering transit lifestyles since area residents can fulfill many of
their daily needs without the use of a car. Perhaps the most difficult “D” to quantify is design. Some efforts have accepted the challenge and attempted to assign objective values to aesthetics such as architectural styles, streetscaping, and the overall pedestrian experience of the built environment.

Despite the difficulty in measuring the 3 D’s, they provide a solid starting point for evaluating and comparing the transit orientation of existing and future transit communities. Significant research has suggested that density, diversity and design are all highly related to transit ridership. What the generalized 3 D’s may lack, however, are other critical facets such as pedestrian and bicycle facilities, transit connectivity and regional accessibility, all of which are important drivers of transit use. For the purpose of examining the transit orientation of disparate communities, it is important to start with the D’s and then incorporate other key drivers of personal and household travel behavior in the region.

_The 5 P’s of Transit Oriented Communities_

Whereas the 3 D’s help illustrate the characteristics of a station area’s built environment, they do not reflect other key elements of mobility that help facilitate transit lifestyles. A historic downtown, like Puyallup for instance, may exhibit higher densities with its smaller lot sizes, diversity with its Main Street, and good design with its compact blocks, but it could very well generate few transit riders with relatively limited commuter train service. A closer-in suburban style station area (e.g. Northgate) with multiple bus lines, on the other hand, could prove the exact opposite.

For these reasons, it is valuable to add mobility dimensions in developing transit orientation portraits within the region. Rather than simply adding more D’s, it is helpful to differentiate this approach by proposing the 5 P’s of transit oriented development: population, possibility, physical form, performance, and pedestrian/bicycle connectivity.

For the purposes of better capturing “urban character” in a composite measure, a more holistic view of the transit friendliness of station areas is as follows:

- **Population**: The number of residents and workers in an area has a direct correlation with reduced auto trips;²
- **Possibility**: Areas with commercial urban amenities such as restaurants, grocers, and specialty retail not only allow residents to complete daily activities without getting in a car, but they also improve the likelihood of higher density development by increasing residential land values;³
- **Physical Form**: Small block sizes promote more compact development and walkability;⁴

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- **Performance:** The availability and frequency of bus and rail connections allows residents to take transit to multiple off-peak destinations in addition to the traditional commute trip downtown.
- **Pedestrian/Bicycle:** Sidewalks and low stress bikeways provide active transportation connections to transit and other local destinations.

**Population**

Population, or density, is often the focus of transit planning and TOD implementation efforts. Indeed, where there are more people, there is a larger potential market for transit riders. Furthermore, bringing more people to station areas can start a virtuous cycle where a larger market warrants enhanced transit service and a more diverse mix of land uses, thereby attracting more people and further expanding transit access and housing choices.

There is no magic number of people that will best optimize a station’s use. As is evidenced by the other Ps, there are a number of other physical and social attributes that help explain an area’s travel behavior. Generally speaking, however, it is commonly held that light rail and bus rapid transit station areas should seek to approach or exceed 20-30 housing units per acre (approximately 30-75 residents per acre depending on household sizes) and/or 50 employees per acre in order to optimize a region’s investment in fixed guideway transit.

The chart below illustrates the relationship between the number of residents in the region’s inner and outer suburban study areas (outside Seattle’s CBD) to transit’s share of the journey-to-work trip. Although nearly 50 percent of the variance is explained by the number of people, there are clearly other factors in the region impacting transit usage.

**Population & Transit Mode Split**
Physical Form

Physical form is the P that attempts to capture the overall urban design of a station area without attempting to subjectively quantify aesthetic characteristics such as architecture and streetscaping. Instead, it employs average block size as a proxy. Not only do areas with smaller blocks possess greater pedestrian connectivity with more streets, they also help create “outdoor rooms” with more vertical style building types on their smaller lot sizes. Station areas with average block sizes of three acres and less have been found to exhibit the highest transit mode splits. To give this a sense of scale, a block 400’ x 300’ is just under three acres in size. Although there are only two study areas that currently meet this threshold, 11 others average blocks of less than five acres in size, or less than the equivalent of 500’ x 500’ blocks.

As demonstrated in the chart below, there is an inverse relationship between average block size and the transit share of the journey to work trip. That is, as block sizes increase and pedestrian connections to transit decrease, transit mode shares go down. Similar to the population in a station area, the physical form P helps explain approximately 40 percent of the variance. Unlike population, on the other hand, the curve is smoother, suggesting that there is not necessarily a key block size that is related to a significant change in ridership either up or down.

<table>
<thead>
<tr>
<th>Station area</th>
<th>Average Block Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainier</td>
<td>2.70</td>
</tr>
<tr>
<td>Roosevelt</td>
<td>2.85</td>
</tr>
<tr>
<td>Beacon Hill</td>
<td>3.04</td>
</tr>
<tr>
<td>Commerce Street Station</td>
<td>3.08</td>
</tr>
<tr>
<td>South 25th Street Station</td>
<td>3.08</td>
</tr>
<tr>
<td>Convention Center Station</td>
<td>3.11</td>
</tr>
<tr>
<td>Union Station</td>
<td>3.16</td>
</tr>
<tr>
<td>Theater District Station</td>
<td>3.26</td>
</tr>
<tr>
<td>Brooklyn</td>
<td>3.51</td>
</tr>
<tr>
<td>Tacoma Dome Station</td>
<td>3.80</td>
</tr>
<tr>
<td>Mount Baker</td>
<td>3.81</td>
</tr>
<tr>
<td>Columbia City</td>
<td>4.65</td>
</tr>
<tr>
<td>Othello</td>
<td>4.82</td>
</tr>
</tbody>
</table>

Whereas closer-in neighborhoods like Capitol Hill (top) possess a fine grain of smaller blocks, neighborhoods (Shoreline, bottom) further out tend to be more suburban in nature with less connectivity.

Possibility (Places)

Possibility is the P that represents the diversity of uses within a station area. Not only does a mixed use neighborhood allow area residents to lead transit lifestyles by meeting everyday retail and service needs, it also has the potential to attract transit riders to the area for dining and entertainment. For the purposes of an initial analysis, possibility is an estimate of the number of retail establishments within individual study areas. Like elsewhere in the country, the relationship between places and the transit share of the journey to work trip is the weakest of the P’s. What is not reflected, however, are the transit, walking and biking mode shares for non-work trips.

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6 We recommend that further technical work would need to be done to assess the applicability of an appropriate land use diversity measure.
Performance
As mentioned above, the 3 D's of TOD do not directly factor in key mobility characteristics related to the likelihood of residents and employees taking transit. First and foremost, they do not account for the availability and frequency of all modes of transit service. For people to build their lifestyles around transit, they require access to frequent and reliable multidirectional service to their non-work destinations. Thus, it is recommended that the typology incorporate a Performance measure illustrating the intensity, or richness, of transit service within study areas. Because the Puget Sound region study areas are in very different stages of light rail system development, some consideration of future phasing should be given.

Pedestrian & Bicycle
The other key mobility metric to include in the typology is some measure of the availability of quality Pedestrian and Bicycle facilities. Study area residents and employees are more likely to access their stations by foot or pedal if they are able to do so safely and conveniently. Furthermore, they will be more inclined to walk and roll to nearby shops and services, thereby maximizing the potential health and environmental benefits of transit. For the purposes of the typology, it is recommended that sidewalks and bikeways be used as proxies for pedestrian and bicycling quality. Given that only the most intrepid and fearless cyclists are likely to use bike lanes on high speed and traffic arterials, it is suggested that bikeways include only lower-stress routes such as multi-use paths (e.g. Interurban Trail, Burke-Gilman Trail) and bike boulevards.

Study Area Comparisons
Once the P’s are chosen, it will be possible to compare a given area’s performance relative to other study areas by indexing each of the categories on a scale of 1-100, with the top performing study area scoring 100. Since downtown Seattle (and perhaps Bellevue) study areas will score significantly higher than inner-ring neighborhoods and suburban communities given its historic advantage and high concentrations of employment,
population and retail, it is recommended that they be excluded from the comparative analysis. For evaluation purposes, it is appropriate to compare study areas outside of downtown and its immediate environs (e.g. First Hill, South Lake Union). Some locations may be strong on one or more of the five ‘P’s but weaker on the others. The figures below show different station areas evaluated in another region based on their ‘P’s.

**Combined Transit Orientation**

By indexing and combining the 5 P’s, it is possible to compare the region’s corridors and study areas for their relative levels of overall transit orientation. Given the P’s relationships to transit mode share, this combined transit orientation score is linked directly to performance, thereby providing a holistic measure of those conditions that contribute to ridership both now and, more than likely, into the future. The chart below uses theoretical stations to demonstrate how the relative combined and individual transit orientation scores for all of the study areas could then be illustrated and mapped by transit corridor. Lastly, the total combined transit oriented scores would then be mapped to form the basis for the development of the implementation-based typology.
Recommendations for Transit Community Implementation Typology
DRAFT July 3, 2012

The X-Axis: Market Strength

The second key element of the Places typology is the market component, representing the near-term development potential of study areas. The purpose of adding this step is to infuse the approach with market realities when prioritizing areas for limited public resources. Some study areas, for instance, may exhibit strong urban form characteristics, but, given their current market, may not be ripe for catalytic investments that are unlikely to attract private development in the near-term. Rather, these same areas may be ideal candidates for focused planning efforts to identify current market barriers.

To capture the current development environment of individual study areas, CTOD recommends that the Places typology incorporate the market index methodology created by Strategic Economics. These holistic snapshots of existing conditions include a number of market drivers including lease and vacancy rates, employment, household sales, and development activity. Both the residential and commercial indices could be combined into a single value to capture the complete market picture for individual study areas.

Strategic Economics developed a set of quantitative residential and commercial TOD market indices that provide a numeric assessment of TOD demand potential based on a series of demographic, market and employment data inputs. The indices provide insight into the relative potential demand for new development around transit among the study areas. The indices represent market strength in the near-to-mid term; longer term potential for TOD may vary based on public policy decisions and the level of investment directed towards the study areas.

The residential market strength index is intended to evaluate potential demand for residential transit-oriented development, primarily multifamily or compact in nature. The data sets used in the residential market strength index were chosen based on the demographic and market factors that have the potential to impact or predict future growth around transit. These include real estate market indicators, employment patterns, density, and household characteristics.

The commercial market strength index focuses on the demand for transit-oriented commercial space, which is primarily located in office buildings. As with the residential market strength index, the data sets used in the commercial market strength index were chosen based on the employment and market factors that have the potential to impact or predict future growth. These include employment patterns by industry, particularly those industries that prefer locations near transit, change in employment, and commercial real estate market indicators.

The Combined Places Profile: Transit Orientation and Market Strength

The composite transit orientation (y-values) and market scores (x-values) would then be plotted for the region’s study areas. It is this scatterplot that can be used to develop the Places typology based on implementation clusters around study areas with common transit orientation and market conditions. The graphic below illustrates how three types were developed for station areas in Portland, OR. The upper tier, characterized as Infill + Enhance station areas, exhibited strong urban form and market strength, thereby qualifying them for regional funds in the form of catalytic investments. The lower tier, on the other hand, represented stations with limited assets and market potential. Given their need for strategic
evaluation, these Plan + Partner areas were targeted for near-term planning efforts to identify TOD opportunities and constraints.
INTEGRATING PEOPLE AND PLACES

As mentioned previously, both the People and Places profiles should be used equally to inform local and regional TOD activities. Whereas the People profile should prioritize efforts to promote equity across the transit system, Places should help guide catalytic TOD projects and infrastructure investment. Given the limited availability of public funds and technical resources for the 74 study areas, it is recommended that the two typologies be reconciled to develop a phased approach to implementation.

Once the two typologies are completed, it is anticipated that some study areas may perform strongly from a Places perspective while also exhibiting a high priority for People-related activities. Conversely, other areas will score lower in both typologies. These extremes should represent the ends of the spectrum in terms of phased activities. Whereas the former should represent a candidate for immediate implementation efforts, the latter should be a lower priority and monitored over time in case conditions change rapidly.

For both the People and Places profiles, CTOD has provided some recommendations for classifying study areas into immediate, near-term and longer-term priorities for investment in equitable transit communities. Each of these phasing categories may include more than one package of implementation activities, but this phasing can provide a way to group the eight to nine implementation types defined in each profile into a smaller, more manageable set of categories.

CTOD recommends evaluating how study areas perform side-by-side on People and Places, and discerning whether patterns exist in which study areas are high priorities on Places and high priorities on People. Further, there may be a need to revisit the profile approach based on this side-by-side comparison. For example, study areas that rank high on investments in catalytic development or infrastructure needs may have been classified as mid-term priorities for equitable investments. However, if catalytic development occurs in these places, the need for equitable investments may also be changed to become more immediate.

Once the analysis is complete, there may be ways to synthesize performance on each profile into a framework that identifies overall immediate, near-term, and long-term study areas for equitable transit communities. However, the classification of study areas will need to occur before this synthesis can be established.