APPENDIX I:

Pedestrian Network Needs Memo

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MEMORANDUM

To: PedPDX Technical Advisory Committee; Michelle Marx, City of Portland Bureau of Transportation; Lidwien Rahman, Oregon Department of Transportation

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Date: May 24, 2018

Subject: PedPDX Network Needs Evaluation - DRAFT

INTRODUCTION

Purpose

The PedPDX Pedestrian Network Needs Evaluation assesses existing infrastructure for people walking along and across the citywide Pedestrian Priority Network, and identifies locations of gaps and deficiencies in this infrastructure. This memo describes the results of the needs evaluation and includes a summary of the criteria and methods used. The infrastructure that was evaluated includes marked pedestrian crossings ("across") and sidewalks ("along"). The criteria used in the evaluation were developed by the City of Portland and are described in the PedPDX Network Completeness and Adequacy Criteria Memo.

Pedestrian Priority Network

The Pedestrian Priority Network is a network of streets in Portland, developed through the PedPDX planning process, that are designated as a priority for people walking. Streets within the priority network are assigned pedestrian classifications based on the level of pedestrian demand. Pedestrian classifications (listed in descending order of demand) include the following:

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- Major City Walkways: These walkways are comprised of the Civic and Neighborhood Corridors and Main Streets, as defined by Portland's 2035 Comprehensive Plan, all streets along the planned and existing Frequent Transit Network, core downtown streets, and off-street trails in high demand corridors.

- City Walkways: These walkways are comprised of all arterial streets, collector streets, streets with transit service that are not designated as Major City Walkways, and off-street trails in moderate demand corridors.

- Neighborhood Walkways: These walkways are comprised of all local streets within pedestrian districts, within a half-mile of a light rail station, on a designated Safe Routes to School travel route, and on an existing or funded neighborhood greenway. Neighborhood walkways also include designated paths with the street right-of-way and neighborhood trails.

- Local Streets: Local streets are included on the network if they are located in one of the district overlay classifications.

CROSSING THE ROADWAY

PedPDX identifies pedestrian needs "across" the roadway based on gaps (where a crossing is not provided) and deficiencies (where a crossing is provided, but identified as insufficient).

Gaps

The needs evaluation defines a crossing gap as a segment of a City Walkway or Major City Walkway on the Pedestrian Priority Network where the distance between marked pedestrian crossings exceeds the City of Portland's Interim Spacing Guidelines. Neighborhood Walkways are not included in the crossing gaps evaluation. Marked crossings include those with basic parallel striping, high-visibility striping, and those indicated with distinct paving materials (for example, on the downtown transit mall).

Guidelines

The City of Portland's interim spacing guidelines for marked pedestrian crossings are as follows (for more information, see the Network Completeness and Adequacy Criteria Memo):

- On City Walkways and Major City Walkways *within* pedestrian districts, the desired marked crossing spacing is 530 feet apart.
- On City Walkways and Major City Walkways *outside of* pedestrian districts, the desired marked crossing spacing is 800 feet apart.

Methods

1. City Walkway or Major City Walkway streets on the Pedestrian Priority Network were split into segments at the locations of marked crossings.
2. The length of each street segment was rounded to the closest interval of 10'.
3. The crossing spacing guidelines for streets within and outside pedestrian districts were applied to each street segment. Crossing spacing guidelines for pedestrian districts were applied to all segments partially within a pedestrian district.

4. For a street segment identified as a gap, the length of the segment was divided by the desired crossing spacing to arrive at a rough estimate of how many additional crossings are needed citywide.

Findings

On the majority of Portland's City Walkways and Major City Walkways, marked crossings are spaced too far apart to meet the City's guidelines. The distribution of such crossing gaps varies geographically. Gaps are less common within pedestrian districts than outside of them.

The gaps analysis found:

- A total of 464 miles of City Walkway and Major City Walkway with crossing gaps, 79% of the 590 total centerline miles of streets with those designations.
- The longest gap is 49,011 feet, or 9.28 miles, on NW Skyline Boulevard.
- The mean length of gaps between crossings is 1,874 feet, or roughly 1/3 mile.
- Approximately 3,520 new marked crossings, with design appropriate to the street type, would need to be installed citywide in order for all City Walkways and Major City Walkways to meet the spacing guidelines.

Pedestrian Districts

Within pedestrian districts, the initial analysis identified the following:

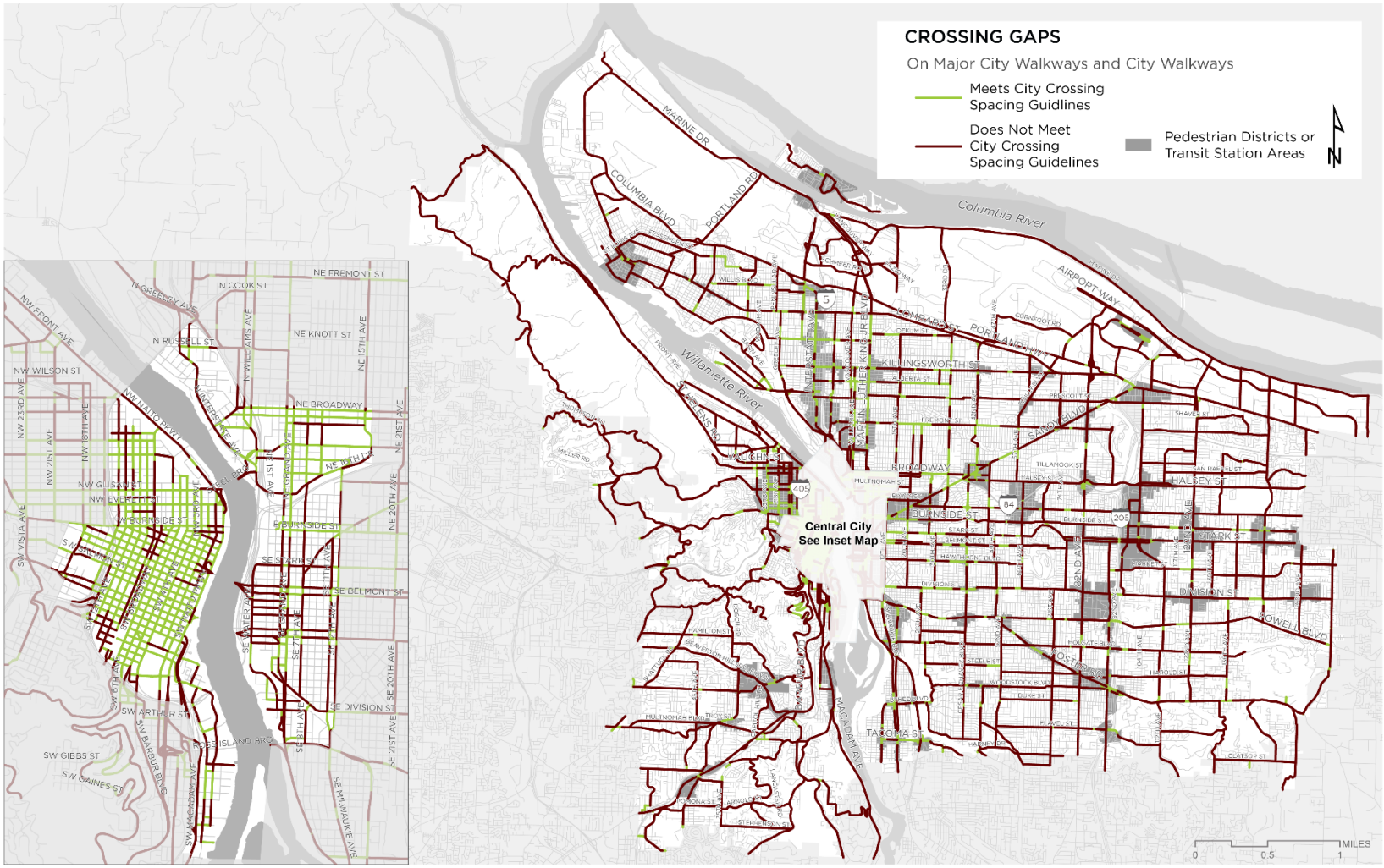
- 147 miles of City Walkway/Major City Walkway where gaps are present, representing 66% of the total miles within pedestrian districts
- Mean gap distance of 1,277 feet, or 2.4 times the spacing guidelines
- Need for approximately 1,440 new marked crossings

City Walkways and Major City Walkways outside of Pedestrian Districts

On City Walkways and Major City Walkways outside of Pedestrian Districts, the initial analysis identified the following:

- 317 miles of City Walkway/Major City Walkway where gaps are present, representing 86% of the total miles outside of pedestrian districts
- Mean gap distance of 2,394 feet, nearly 3 times the spacing guidelines
- Need for approximately 2,080 new marked crossings

Figure 1 Crossing Gaps on the Pedestrian Priority Network



This map illustrates that gaps between marked crossings are most prevalent on Portland's west side outside of downtown, and more prevalent in East Portland than in North, Inner Northeast, and Southeast Portland.

Deficiencies

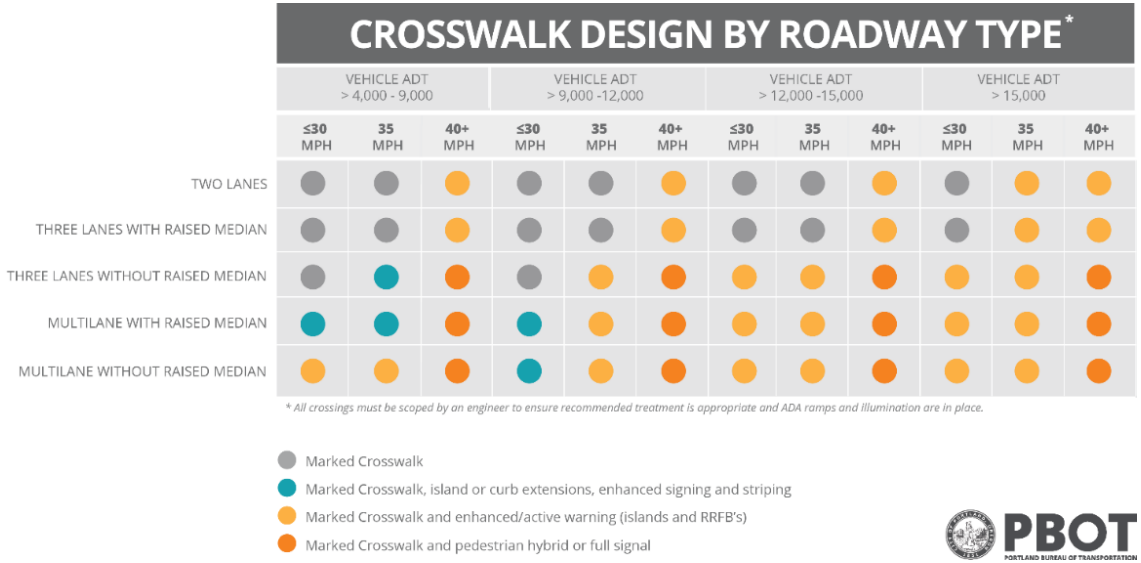
The needs evaluation assessed the sufficiency of all marked crossings on Pedestrian Priority Network streets with a designation of City Walkway or Major City Walkway. Crossings were identified as potentially deficient if the existing crossing design did not meet the City of Portland's design guidelines, as outlined below.

Criteria

The City of Portland has established the desired design of a crosswalk based on the speed limit, number of lanes, and average daily traffic (ADT) of the roadway that it crosses, as illustrated in Figure 1. Generally, the streets with higher volumes and more lanes need a more robust crosswalk design. The needs analysis identified those crossings that are potentially deficient based on these guidelines and available data. Ultimately, City engineers will assess each potentially deficient crossing location to determine the appropriate design.

The guidelines indicate that marked crossings at signalized intersections are sufficient for all roadways. However, an analysis of crashes involving people walking finds that many crashes occur at signalized intersections (for more information see the Pedestrian Safety Existing Conditions memo). While signalized intersections are not identified as a potential deficiency in the needs evaluation, in the next phase of PedPDX, the Pedestrian Network Prioritization will include signalized intersections with a high historic crash rate paired with other systemic characteristics that are likely to make them more dangerous to people walking.

Figure 2 Crosswalk Design by Roadway Type



Based on the chart in Figure 2, the evaluation considers a crossing to be *sufficient* if one of the following is true:

- The location requires a marked crosswalk (as indicated by a grey circle) and a marked crosswalk is present.
- The location requires a curb extension or pedestrian refuge island to supplement a marked crosswalk (as indicated by a blue circle) and this treatment is present.
- The location requires enhanced/active warnings with islands and Rectangular Rapid Flash Beacon to supplement a marked crosswalk (as indicated in light orange circle), and this treatment is present.
- The location requires a hybrid or full signal to supplement a marked crosswalk (indicated by a dark orange circle), and this treatment is present.

Any marked crossing that does not fall into one of the categories described above is considered to be potentially deficient.

Methods

1. Existing marked crossings were assigned values for the following characteristics of the *crossing*:

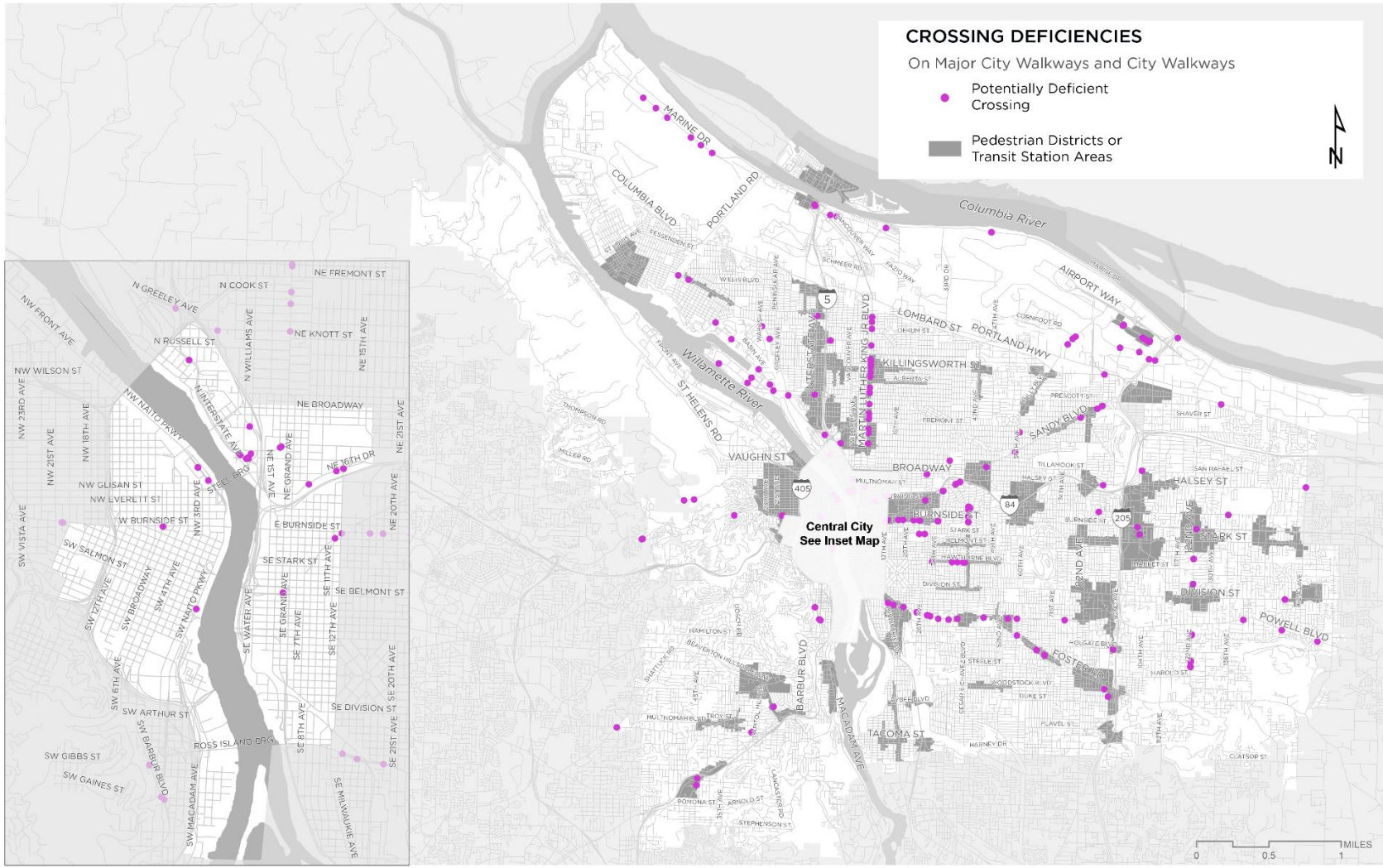
   a. Presence of curb extension
   b. Presence of pedestrian refuge island
   c. Presence of active warning device (RRFB)
   d. Presence of hybrid or full traffic signal

2. Existing marked crossings were assigned values for the following characteristics of the *roadway* on which they are located:
   a. Speed limit
   b. Average daily traffic (ADT)
   c. Number of lanes
   d. Presence of raised median
3. Existing marked crossings were assigned to a crossing design category. For example, a crossing with a pedestrian refuge island but no signal would be assigned to the "blue" crossing category based on the chart shown in Figure 2.
4. The existing crossing design category was compared with the level of design appropriate for the roadway type. In the example in step 3, if that crossing were on a roadway with two lanes, speed limit of 40 mph, and ADT of between 9,000 and 12,000, it would be assigned to the "orange" roadway design category.
5. Deficient crossing were identified as those where the roadway category calls for a level of design that exceeds the existing crossing design.

Findings

There are 221 deficient marked crossings on City Walkways and Major City Walkways, about 5% of the total. The number is relatively low partly because nearly 70% of the marked crossings on City Walkways and Major City Walkways are at a signalized intersection, which is deemed sufficient for all roadway types for the purposes of this evaluation.

Figure 3 Crossing Deficiencies on the Pedestrian Priority Network



This map illustrates that potentially deficient crossings are concentrated on arterial streets with multiple mid-block crossings.

Deficient crossings are concentrated on larger, busier streets for which the desired crosswalk design is a shade of "orange," that is, at least a marked crossing with an RRFB or signal. Most of the deficient crossings that should be in the "orange" design category are actually "grey", meaning they have a marked crosswalk with no other design elements. The vast majority of deficient crossings – 86% – are located in places where crossings are spaced close enough together to meet the City's spacing guidelines. Examples of major streets with many closely-spaced deficient crossings include NE Martin Luther King, Jr Boulevard and SE Powell Boulevard.

Figure 2 shows the number of crossing deficiencies organized by the existing design versus the desired crossing design for the roadway. About 30% of the marked crossings analyzed fall on a road where the desired crossing design includes an RRFB or signal, but they make up 90% of the deficient crossings.

Figure 4 Number of Crossing Deficiencies: Existing Crossing Design compared with Design Guidance

Existing Crossing Design	Desired Crossing Design for Roadway		
	Blue: pedestrian refuge or curb extension	Light Orange: RRFB	Dark Orange: hybrid or full signal
Blue: marked crosswalk with pedestrian refuge island or curb extension	NA	87	1
Grey: marked crosswalk	13	111	9

ALONG THE ROADWAY

PedPDX identifies pedestrian needs "along" the roadway based on gaps (where a pedestrian walkway is not provided). It does not identify deficiencies. While deficiencies were considered within the process, the project team did not analyze these needs for two reasons: 1) available data is inconsistent and difficult to interpret when it comes to sidewalk width, clear zones for pedestrians, and similar aspects of sidewalk design; and 2) in the face of limited public resources, a lack of any pedestrian facility (a gap) will be prioritized over an existing facility that is substandard. This decision does not preclude the City from investing in sidewalk or trail deficiencies on the Pedestrian Priority Network in the future.

Gaps

The Network Needs Evaluation defines a walkway gap along the roadway as a segment of any Pedestrian Priority Network street, including all Major City Walkways, City Walkways, and Neighborhood Walkways, that does not meet the City of Portland's guidelines. Sidewalk data was available for 95% of street centerline miles on the Pedestrian Priority Network. Planned regional trails are also considered to be gaps in the network.

Guidelines

Requirements for pedestrian walkways are based on the 1998 Pedestrian Design Guide. City requirements state that all streets should have sidewalks on both sides. The needs analysis identifies two types of gaps: street segments with a sidewalk gap on both sides of the street, and street segments with a sidewalk gap on only one side of the street. Trails gaps are included within the category of "gap on both sides of the street."

In recognition of new City Comprehensive Plan policies indicating that context-sensitive walkways may be more appropriate than a traditional sidewalk on both sides of the roadway in certain locations, PedPDX is developing guidelines for Alternative Pedestrian Walkways. In a future phase of planning, the PedPDX Toolkit will provide guidance for the application of alternative street design treatments, including "walkway on one side" and "shared local street." These treatments may represent complete walkways provided that certain criteria are met. Applicability of Alternative Pedestrian Walkway designs are not assessed as part of the network completeness and adequacy criteria, but will be considered during the project development process as needs are addressed.

Methods

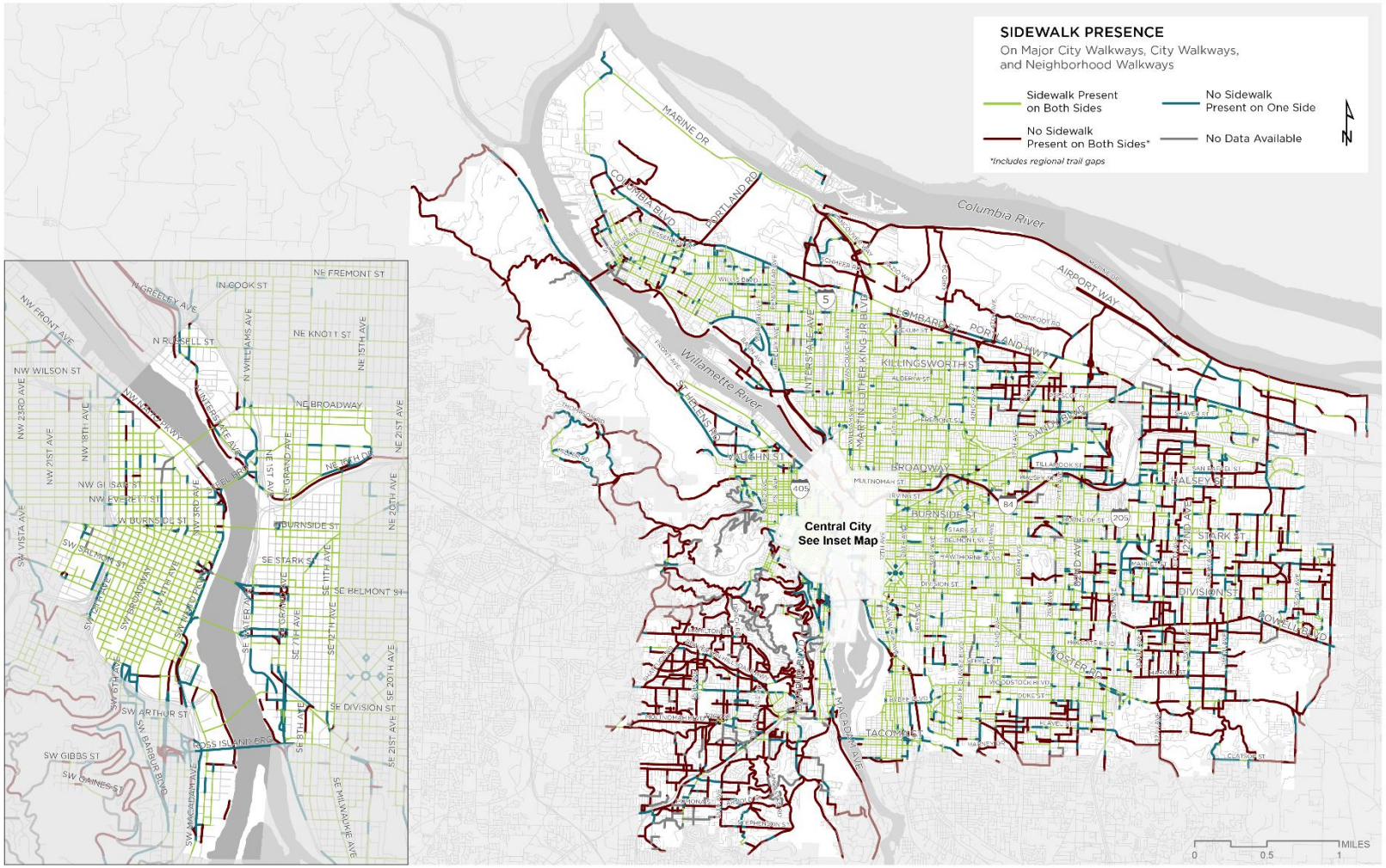
1. The presence of sidewalks along Pedestrian Priority Network streets was summarized for each side of each street segment. In general, each street segment is equal to one block, but there is considerable variation, particularly in areas where streets do not follow a grid pattern.
2. All street segments were assigned to one of the following categories:
    a. Not a gap: continuous sidewalk present on both sides of the street (or built trail)
    b. Gap: sidewalk gap on both sides of the street (this includes street segments with intermittent sidewalks on both sides and planned but not built trails)
    c. Gap: sidewalk gap on one side of the street
    d. No data: data was not available for every Pedestrian Priority Network street

Findings

On Pedestrian Priority Network streets for which data was available, 45% of centerline miles have sidewalk gaps on one or both sides of the street. This represents 425 miles of street. Based on the available data, roughly 600 miles of new sidewalk would be needed to fill all of these gaps, about 380 miles on Major City Walkways or City Walkways. Of those streets with sidewalk gaps:

- 31%, about 132 centerline miles, have a sidewalk gap on one side
- 69%, about 293 centerline miles, have a sidewalk gap on both sides
- 36.8 miles of regional trail gaps exist

Figure 5 Sidewalk Gaps on the Pedestrian Priority Network



Sidewalk gaps on the Pedestrian Priority Network are distributed unevenly throughout Portland. They are very prevalent in Southwest Portland and east of 82nd Avenue. Two neighborhoods that are just west of 82nd Avenue also have gaps on most of their streets: Northeast Portland's Cully neighborhood, and the Brentwood-Darlington neighborhood of SE Portland.