

Metro | Agenda

Meeting: Joint Policy Advisory Committee on Transportation (JPACT)
Date: Thursday, April 10, 2014
Time: 7:30 to 9 a.m.
Place: Metro Regional Center, Council Chamber

7:30 AM	1.	CALL TO ORDER, DECLARATION OF A QUORUM & INTRODUCTIONS	Craig Dirksen, Chair
7:32 AM	2.	CITIZEN COMMUNICATIONS ON JPACT ITEMS	
7:35 AM	3.	UPDATES FROM THE CHAIR & COMMITTEE MEMBERS	Craig Dirksen, Chair
		<ul style="list-style-type: none">• Diversity Action Plan Demographic Survey• Preliminary Issues regarding Transportation Funding in the 2015 Legislative Session• Release of Oregon Health Authority Community Climate Choices Health Impact Assessment	Kim Ellis, Metro
7:45 AM	4.	** CONSIDERATION OF THE MINUTES FOR MAR. 13, 2014	Craig Dirksen, Chair
7:50 AM	5.	* Resolution Number 14-4501 For the Purpose of Endorsing The Federal Transportation Revenue Proposal Introduced By Transportation For America – <u>ACTION</u>	Andy Cotugno, Metro
8:05 AM	6.	* Unified Planning Work Program (UPWP) Project Additions – <u>ACTION</u>	Tom Kloster, Metro Chris Myers, Metro
8:20 AM	7.	* Environmental Justice and Title VI Assessment of the 2014 RTP and 2015-18 MTIP – <u>INFORMATION/DISCUSSION</u>	Ted Leybold, Metro Grace Cho, Metro
8:30 AM	8.	* Review of the Oregon Consensus Transportation Policy, Communication and Coordination Assessment Report and Process Recommendations for ODOT Region 1 – <u>INFORMATION/DISCUSSION</u>	Steve Bryant, Oregon Consensus
9 AM	9.	ADJOURN	Craig Dirksen, Chair

Continued on back...

Upcoming JPACT meetings:

- **April 11** – Joint JPACT/MPAC meeting
- **May 1st** – Bi State Coordinating Committee
- **May 8** – Regular JPACT meeting
- **May 30** – Joint JPACT/MPAC meeting

* Material available electronically.

** Material will be distributed in advance of the meeting.

For agenda and schedule information, call 503-797-1700. To check on closure or cancellations during inclement weather please call 503-797-1700.

Metro's nondiscrimination notice: Metro respects civil rights. Metro fully complies with Title VI of the Civil Rights Act of 1964 that bans discrimination on the basis of race, color or national origin. For more information on Metro's civil rights program, or to obtain a Title VI complaint form, visit www.oregonmetro.gov/civilrights or call 503-797-1536. Metro provides services or accommodations upon request to persons with disabilities and people who need an interpreter at public meetings. All Metro meetings are wheelchair accessible. If you need a sign language interpreter, communication aid or language assistance, call 503-797-1536 or TDD/TTY 503-797-1804 (8 a.m. to 5 p.m. weekdays) 7 business days in advance of the meeting to accommodate your request. For up-to-date public transportation information, visit TriMet's website at www.trimet.org.

2014 JPACT Work Program

4/10/14

January 9, 2014

- Active Transportation Plan work group refinements and Regional Transportation Plan edits – Comments from the Chair
- Powell Boulevard east of I-205: UPWP amendment to add a planning study and a subsequent TIP amendment for a Preliminary Engineering phase for funding received from the legislature to study and engineer street design changes – Action
- 2014 Regional Transportation Plan process update and share draft project list – Information
- Climate Smart Communities Scenarios Project: First Look at Results (Part 3) and discussion proposed process for shaping preferred approach in 2014 – Information / discussion
- Powell-Division project approach and roster – Information / action
- Permission to Use Federal Streamlining Provision for Regional Air Quality Conformity

February 13, 2014

- Review agenda for JPACT trip to Washington, DC – Information/ Discussion
- Resolution No. 14-4501: Endorsing the Federal Transportation Revenue Proposal Introduced by Transportation for America – Action
- Oregon Statewide Transportation Strategy Vision and Short-Term Implementation Plan (Reducing greenhouse gas emissions) – Information
- Climate Smart Communities Scenarios Project: Review recent opinion research compiled by DHM and suggest topics to include in upcoming public opinion research – Adam Davis - Information/Discussion
- Climate Smart Communities Scenarios Project: Approving the process for shaping and adoption of the preferred approach in 2014 – Approval requested

FYI: Final Prep Meeting for those attending the 2014 Annual JPACT Lobby Trip, Metro Regional Center, 370A/B, Monday, Feb. 24, 5 – 6 p.m.

March 13, 2014

- Preview of public review draft 2014 Regional Transportation Plan – Information
- Preview of the public review draft of the Active Transportation Plan work group refinements and Regional Transportation Plan edits – Information
- Regional Flexible Fund retrospective findings – Information/discussion
- Climate Smart Communities Scenarios Project – Discuss Step 3 background information – Information/Discussion
- UPWP Status Update – Comments from the Chair

FYI: Public comment period on draft 2014 Regional Transportation Plan and draft Active Transportation Plan, March 21 – May 5

FYI: 2014 Annual JPACT Lobby Trip, Washington, DC, March 5-6

FYI: National Assoc. of Counties (NACo) Congressional Conference, Washington, DC, March 1-5

FYI: National League of Cities, Washington, DC, March 8-12

April 10, 2014

- Review of Oregon Consensus Study of Transportation decision making in ODOT Region 1
- Findings from the 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI analysis – Information/ discussion
- Draft 2015-18 Metropolitan Transportation Improvement Program – Information
- Update to the 2013-15 UPWP – Action
- Resolution Number 14-4501 For the Purpose of Endorsing The Federal Transportation Revenue Proposal Introduced By Transportation For America – Action

FYI: Friday, April 11, Joint MPAC/JPACT Meeting 8 AM- Noon

FYI: April 21 – 22, Oregon Active Transportation Summit, Portland, OR

<p><u>May 8, 2014</u></p> <ul style="list-style-type: none"> • Air Quality Conformity Determination Comment Period – Comments from the Chair • Preliminary approval of the 2014 Regional Transportation Plan pending air quality conformity determination and public comment period – Action • Preliminary approval of the draft Active Transportation Plan per public comment received – Action • Metropolitan Planning Area Boundary Update – Action • Regional Travel Options Program Evaluation Grant Allocation Process – Information • Climate Smart Communities Scenarios: Preview of draft public engagement report and emerging ideas for draft preferred approach – Information/discussion • Tentative: Conceptual Amendment to 2014 Regional Transportation Plan concerning the Columbia River Crossing <p>FYI: Friday, May 30, Joint MPAC/JPACT Meeting <i>Climate Smart Communities Scenarios Project: Approval of draft preferred approach, subject to final evaluation and public review (Step 5) – Recommendation to the Metro Council</i></p> <p>FYI: May 14-17, WTS International Annual Conference, Portland OR</p>	<p><u>June 12, 2014</u></p> <ul style="list-style-type: none"> • Streetcar Evaluation Model: Discuss preliminary results of FTA funded research project focused on developing tools to better understand economic impacts of streetcar investments – Seek JPACT input on next steps in work program • Climate Smart Communities Scenarios Project – Discuss findings and recommendations from Health Impact Assessment – Oregon Health Authority - Information/Discussion • 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI Assessment – Action – request for approval <p>FYI: Public comment period on Air Quality Conformity results for the draft 2014 Regional Transportation Plan, May 16 – June 15</p>
<p><u>July 10, 2014</u></p> <ul style="list-style-type: none"> • Adopt the Active Transportation Plan – Action • Adopt the 2014 Regional Transportation Plan – Action • 2015-18 Metropolitan Transportation Improvement Program – Action <p>FYI: National Assoc. of Counties (NACo) Annual Conference, New Orleans, LA, July 11-14</p>	<p><u>August 14, 2014</u></p> <ul style="list-style-type: none"> • Climate Smart Communities Scenarios Project: Discuss draft Regional Framework Plan amendments and near-term implementation recommendations (Step 6)– Information/Discussion
<p><u>September 11, 2014</u></p> <ul style="list-style-type: none"> • Climate Smart Communities Scenarios Project: Discuss evaluation results and public review draft preferred approach (Step 7) – Information/Discussion <p>FYI: A 45-day comment period is planned from Sept. 5 to Oct. 20, 2014 on the public review draft preferred approach.</p> <p>FYI: 2014 Rail~Volution, Minneapolis, MN, September 21 – 24</p> <p>HOLD: Sept./Oct.: Joint MPAC/JPACT Meeting, if needed</p>	<p><u>October 9, 2014</u></p> <ul style="list-style-type: none"> • Climate Smart Communities Scenarios Project: Review public comments received to date and begin discussion of recommendation to Metro Council on adoption of the preferred approach (Step 7)– Discussion

<u>November 13, 2014</u>	<u>December 11, 2014</u>
<ul style="list-style-type: none">• Climate Smart Communities Scenarios Project: Adoption of the preferred approach (Step 8) – Recommendation to the Metro Council requested <p>FYI: National League of Cities Congress of Cities and Exposition, Austin, TX, November 18 - 22</p>	

Parking Lot:

- Regional Indicators briefing
- Presentation by the Oregon Trucking Association
- Oregon Resiliency Plan

Executive Summary

Community Climate Choices Health Impact Assessment

Climate change may pose serious risks to public health. Significant shifts in the climate are already happening. The Third National Climate Assessment found that as the climate continues to change, Oregon will likely experience more frequent heat waves and wildfires, an increase in asthma and other respiratory diseases, changes in disease patterns, and diminishing water quality and quantity [1]. Curbing climate change is a critical public health issue and national public health officials support efforts across the nation to reduce greenhouse gas (GHG) emissions.

The recommendations offered in this Community Climate Choices Health Impact Assessment (CCC HIA) will be considered during Phase 3 of Metro's Climate Smart Communities Scenarios (CSCS) Project, underway in the Portland, Oregon metropolitan region. The focus of the project is to understand and choose the best way to reduce GHG emissions through transportation and land use strategies. The CSCS Project seeks to reduce GHG emissions by reducing per capita vehicle miles traveled (VMT) for light duty-vehicles and by investing in technologies that reduce emissions.

Community Climate Choices Health Impact Assessment Scope

Geography: Portland, Oregon metropolitan region within the Urban Growth Boundary

Timeline: 2010 (base year) to 2035 (horizon year)

Scenarios - adopted local and regional plans with:

A: existing revenues

B: increased revenues from existing sources

C: new plans, policies and revenue sources

Exposure pathways: physical activity, traffic safety, air quality, land use

Quantitative tool: Integrated Transportation Health Impact Model (ITHIM)

Other considerations: magnitude of health costs associated with health pathways, vulnerable populations.

Health Impact Assessment (HIA) is a way to consider how a policy or plan affects community health before the final decision is made. By providing objective, evidence-based information, HIA can increase positive health effects and mitigate unintended health impacts. The Public Health Division of Oregon Health Authority (PHD) conducted this assessment at Metro's request, with funds provided by the Center for Disease Control and Prevention's Healthy Community Design Initiative.

Investments in land use and transportation systems that reduce GHG emissions positively impact health by increasing physical activity, reducing traffic collisions and improving air quality. PHD and Metro agreed that the CCC HIA is necessary to better inform Metro and its partners in the selection of a final scenario by December 2014.

Key findings

This analysis found that the strategies under consideration to reduce GHG emissions also result in important health benefits in all exposure pathways, including increased physical activity, fewer traffic injuries and less exposure to air pollutants. These changes are likely to reduce illness and death in the region.

Through a literature review including 348 peer-reviewed articles and government reports linking the built environment to health, PHD found most of the land use strategies under consideration for the CSCS Project promote health. Evidence shows that elements such as level of residential density, land use mix, the number of nearby community destinations and ease of street connectivity are effective at promoting active transportation. Scenario B and C subsections labeled ‘Complete Streets and Active Transportations Investments’ support healthy behaviors the most. These strategies include better street connections, safer street crossings, wider sidewalks, safer street crossings, improved bus stops, more bikeways, trails and on-street bicycle facilities, and more efficient operation of transit signals.

The literature also aligns with advisory members’ equity concerns. Low-income households in search of affordable housing options may locate in neighborhoods that are not well-served by affordable transportation options and have fewer health-supportive amenities. This underscores the need to create and preserve affordable housing options in areas that are well-served by transit.

Integrated Transport and Health Impact Model (ITHIM)

In addition to literature reviews for all pathways, PHD also used a quantitative model, ITHIM, to help understand the relative impact of each of three exposure pathways — physical activity, traffic safety and air pollution as measured by particulate matter (PM2.5) [2]. ITHIM uses relative risks and burden of disease to estimate avoided illnesses (as measured by disability adjusted life years) and deaths for nine conditions associated with physical activity, three conditions linked to PM2.5 exposure, and current traffic fatality rates. A clear limitation of ITHIM is it underestimates all health benefits by restricting calculations to certain pathways and diseases.

Results from ITHIM predict that strategies for reducing GHG emissions will promote health; health benefits occur in all exposure pathways for all scenarios. Scenario A levels of investment are expected to contribute to 64 avoided premature deaths annually. Scenarios B and C would result in 98 and 133 avoided premature deaths respectively. Every 12% decrease in GHG — the difference between each successive scenario — results in an approximate 0.65% decrease in illness among diseases studied.

Physical activity

The most significant and attainable health benefit of active transportation is increased physical activity. Increased physical activity from active transportation could account for as much as 86–91% of avoided deaths and 69–84% of avoided illness resulting from implementing the CSCS project.

We can improve our region’s health and reduce premature deaths by increasing the number of people who regularly walk or bike to the library, school, work, church or store. A safe and convenient transportation system provides individuals with the flexible and healthy options they need to routinely

choose more active modes of transportation. Prioritizing non-automobile users in the design and maintenance of streets increases the safety of all users and will facilitate walking, bicycling and use of public transit.

Traffic safety

Reduced GHG emissions through lower per capita vehicle miles traveled (VMT) results in fewer overall traffic fatalities and injuries. Scenario A results in one avoided traffic fatality per year and decreases disabilities from serious injuries (measured by disability adjusted life years or DALYs) by 2.0%. Scenario C would help avoid 12 traffic fatalities and 12.5% of DALYs from serious injuries a year.

Due to the increase in miles covered in active transportation modes, ITHIM shows the absolute numbers of pedestrian and bicycle fatalities will rise even as the rate decreases due to population growth. While physical activity benefits outweigh the risks of active transportation, effort should be made to mitigate traffic hazards for pedestrians and cyclists through traffic calming, street design and mode separation. Efforts should also be made to capture the 53% of ‘interested but concerned’ individuals in the region who would like to bike, but are worried about safety issues.

Air quality

Improved air quality is an important benefit of addressing GHG. Metro is targeting aggressive GHG emission reductions of 12, 24 and 36% for Scenarios A, B and C respectively. However, Metro’s scenarios result in only modest PM2.5 reductions of 2.8, 3.2 and 3.6% due to population growth and reliance on fleet change and fuel technologies. ITHIM results predict a modest decrease in respiratory illness, heart disease cases associated with air pollution, and premature death of lung cancer patients from long-term PM2.5 exposure.

ITHIM only incorporates long-term exposure to PM2.5 and may underestimate health benefits associated with improved air quality. As suggested by the Portland Air Toxics Solutions Project, additional benefits may accrue from lower ambient ozone and air toxic concentrations.

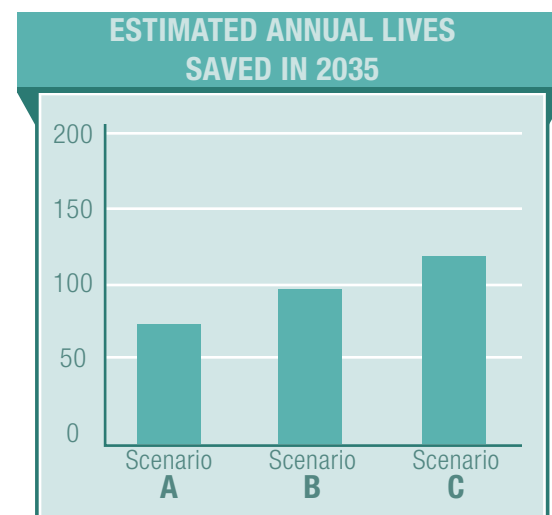
There is no safe level of PM2.5 exposure and current average concentrations of ozone are above safe levels. Episodic PM2.5 (winter) and ozone (summer) events require regional solutions such as leading public efforts to change travel behavior in order to minimize health risk. Poor air quality can be localized and many vulnerable populations live near transportation corridors. Care should be taken to influence increased physical activity while minimizing exposure when designing active transportation facilities and adjoining transportation corridors.

Recommendations

Climate change poses a risk to the future health of Oregonians. Proposed strategies to mitigate climate change will also increase health benefits associated with physical activity, traffic safety and improved air quality. Based upon the findings of this report and with the support of the CCC HIA Advisory Committee, PHD has developed a series of recommendations to preserve and promote healthy communities throughout the region.

By developing and implementing a preferred scenario that meets or surpasses the GHG emissions reduction target set by the Department of Land Conservation and Development, PHD anticipates an improvement in public health.

The majority of health benefits from the CSCS Project can be attributed to active transportation such as walking and biking to work, transit, school and community destinations. Based on this evidence, this HIA recommends that Metro maximize opportunities for active transportation for all communities by:



- Adopting and identifying stable funding for the design elements listed in the subsection ‘Complete Streets and Active Transportation Investments’ of Scenarios B and C: street connections, wider sidewalks, safer street crossings, improved bus stops, bikeways, transit signal priority, and on-street bicycle facilities and trails.
- Improving transit service miles to meet levels recommended in Scenario C.
- Using an equity analysis to plan and develop equal access to active transportation throughout the region.
- While the benefits of physical activity far outweigh the risks, active modes of transportation can lead to increased exposure to traffic injury and air pollution. In order to reduce the risk of increased exposure to traffic injury and air pollution for all road users, this HIA recommends that Metro prioritize the design and maintenance of non-automobile facilities by:
 - Including safety features for pedestrians and bicyclists, such as separation from motorized traffic, when possible. Prioritize non-automobile users in design and maintenance of streets.
 - Providing a parallel bicycle route one block removed from high-volume roads where feasible to reduce exposure to localized pollution while still maintaining access to community destinations.

Per capita VMT reduction is expected to modestly improve air quality as measured by many pollutants including air toxics, but temporal and localized air quality concerns remain. Due to temporal and spatial air quality concerns, this HIA recommends that Metro maximize overall improvements in air quality through actions such as:

- Aligning the CSCS preferred alternative to PATS goals. In collaboration with DEQ, determine how the preferred alternative helps meet Oregon’s adopted ambient benchmark concentrations.
- Reducing exposure by using zoning and incentives to improve indoor filtration systems in new buildings along transportation corridors.
- Convening a regional committee to further address episodic air quality events. Solutions should be season specific and could promote incentives for short-term, alternative commute arrangements.
- Finally, to improve health equity, this HIA recommends Metro ensure social and health goals are considered when prioritizing investments by:
 - Explicitly and transparently addressing how investment links low-income and other vulnerable households to health-promoting resources.



PUBLIC HEALTH DIVISION
 Environmental Public Health
 Center for Prevention and Health Promotion

This document can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request this publication in another format or language, contact the Public Health Division at 971-673-1222, 971-673-0372 for TTY.

The full report is available at: www.healthoregon.org/hia

COMMUNITY CLIMATE CHOICES

Health Impact Assessment (HIA)



Flexible, safe, reliable transportation systems
PROVIDE HEALTHY CHOICES.

Community Climate Choices

Health Impact Assessment

Health Impact Assessment Program
Environmental Public Health Tracking Program
Environmental Public Health
Center for Prevention and Health Promotion
Public Health Division
Oregon Health Authority



Prepared by:

Nicole Iroz-Elardo, Ph.D. (c)
Policy Analyst
HIA Program

Andrea Hamberg, B.A.
Program Coordinator
HIA Program

Eric Main, A.I.C.P.
GIS Analyst
EPHT

Julie Early-Alberts, M.S.
Manager, Healthy Communities Unit
Environmental Public Health

Acknowledgments:

We would like to thank the members of this project's Advisory Group for their time, expertise and participation in this HIA. See appendix B for a complete list of the Advisory Group.

We would like to thank Metro, especially Kim Ellis and Thaya Patton for their assistance, and the Oregon Department of Transportation, in particular Brian Gregor, for providing data and support for the assessment. We would also like to thank Kim Ellis, Elizabeth Clapp, Lainie Smith, Sarah Armitage, Aida Biberic, John McArthur, Barbara Pizacani, and Brendan Haggerty for their thorough review of an early draft of this report. We are grateful to Dr. James Woodcock at the Centre for Diet and Activity Research, Cambridge Institute of Public Health, for allowing us to use ITHIM and for his expert consultation throughout the project, and to Dr. Neil Maizlish at the State of California Department of Public Health for sharing his ITHIM results with us.

Finally, we thank this project's funders, the Centers for Disease Control and Prevention's Healthy Community Design Initiative, for their continued support to build state and local capacity to conduct Health Impact Assessment in Oregon. The contents of this document are solely the responsibility of the authors, and do not represent the views of the Centers for Disease Control and prevention.

Suggested citation: Iroz-Elardo N, Hamberg A, Main E, Early-Alberts J, Douglas, J.P. *Community Climate Choices Health Impact Assessment*. Oregon Health Authority. March 2014: Portland, OR

TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
INTRODUCTION	3
PROJECT OVERVIEW.....	9
CURRENT HEALTH CONDITIONS, RISK FACTORS, AND COSTS	14
FINDINGS: ITHIM – Overview and results	17
FINDINGS: Land use	20
FINDINGS: Physical activity	26
FINDINGS: Traffic safety.....	29
FINDINGS: Cleaner Air.....	32
RECOMMENDATIONS	37
APPENDICES	39
Appendix A. HIA Minimum Elements and Practice Standards.....	40
Appendix B. List of CCC HIA Advisory Committee members	41
Appendix C. County-level BRFSS	43
Appendix D. CDC Chronic Disease Cost Calculator	44
Appendix E. ITHIM methodology and detailed results	47
Appendix F. Air Quality White Paper	55
REFERENCES.....	67

ACRONYMS

BRFSS	Behavioral Risk Factor Surveillance System
CCC	Community Climate Choices
CSCS	Climate Smart Communities Scenarios
DALY	disability adjusted life years (sum of YLL and YLD)
DEQ	Oregon Department of Environmental Quality
GHG	greenhouse gas
GreenSTEP	Greenhouse Gas Strategic Transportation Energy Planning Model
HIA	Health Impact Assessment
ITHIM	Integrated Transport and Health Impact Model
LDV	light-duty vehicle (gasoline powered)
ODOT	Oregon Department of Transportation
PHD	Public Health Division of the Oregon Health Authority
PATS	Portland Air Toxics Solutions
VMT	vehicle miles traveled
WHO	World Health Organization
YLD	years of life with a disability
YLL	years of life lost

EXECUTIVE SUMMARY

Community Climate Choices Health Impact Assessment

Climate change may pose serious risks to public health. Significant shifts in the climate are already happening. The Third National Climate Assessment found that as the climate continues to change, Oregon will likely experience more frequent heat waves and wildfires, an increase in asthma and other respiratory diseases, changes in disease patterns, and diminishing water quality and quantity [1]. Curbing climate change is a critical public health issue and national public health officials support efforts across the nation to reduce greenhouse gas (GHG) emissions.

The recommendations offered in this Community Climate Choices Health Impact Assessment (CCC HIA) will be considered during Phase 3 of Metro's Climate Smart Communities Scenarios (CSCS) Project, underway in the Portland, Oregon metropolitan region. The focus of the project is to understand and choose the best way to reduce GHG emissions through transportation and land use strategies. The CSCS Project seeks to reduce GHG emissions by reducing per capita vehicle miles traveled (VMT) for light duty-vehicles and by investing in technologies that reduce emissions.

Health Impact Assessment (HIA) is a way to consider how a policy or plan affects community health before the final decision is made. By providing objective, evidence-based information, HIA can increase positive health effects and mitigate unintended health impacts. The Public Health Division of Oregon Health Authority (PHD) conducted this assessment at Metro's request, with funds provided by the Center for Disease Control and Prevention's Healthy Community Design Initiative.

Investments in land use and transportation systems that reduce GHG emissions positively impact health by increasing physical activity, reducing traffic collisions and improving air quality. PHD and Metro agreed that the CCC HIA is necessary to better inform Metro and its partners in the selection of a final scenario by December 2014.

Key findings

This analysis found that the strategies under consideration to reduce GHG emissions also result in important health benefits in all exposure pathways, including increased physical activity, fewer traffic

CCC HIA Scope

Geography: Portland, Oregon metropolitan region as defined by the Urban Growth Boundary

Timeline: 2010 (base year) to 2035 (horizon year)

Scenarios - adopted local and regional plans with:

A: existing revenues

B: increased revenues from existing sources

C: new plans, policies and revenue sources

Exposure pathways: physical activity, traffic safety, air quality, land use

Quantitative tool: Integrated Transportation Health Impact Model (ITHIM)

Other considerations: magnitude of health costs associated with health pathways, vulnerable populations

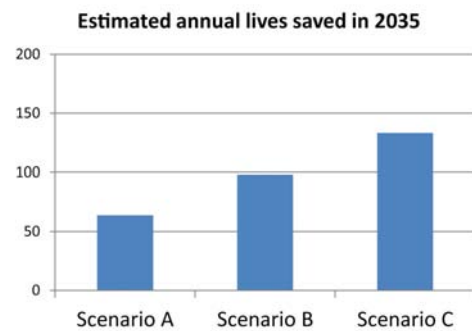
injuries and less exposure to air pollutants. These changes are likely to reduce illness and death in the region.

Through a literature review including 348 peer-reviewed articles and government reports linking the built environment to health, PHD found most of the land use strategies under consideration for the CSCS Project promote health. Evidence shows that elements such as level of residential density, land use mix, the number of nearby community destinations and ease of street connectivity are effective at promoting active transportation. Scenario B and C subsections labeled ‘Complete Streets and Active Transportations Investments’ support healthy behaviors the most. These strategies include better street connections, safer street crossings, wider sidewalks, safer street crossings, improved bus stops, more bikeways, trails and on-street bicycle facilities, and more efficient operation of transit signals.

The literature also aligns with advisory members’ equity concerns. Low-income households in search of affordable housing options may locate in neighborhoods that are not well-served by affordable transportation options and have fewer health-supportive amenities. This underscores the need to create and preserve affordable housing options in areas that are well-served by transit.

Integrated Transport and Health Impact Model (ITHIM)

In addition to literature reviews for all pathways, PHD also used a quantitative model, ITHIM, to help understand the relative impact of each of three exposure pathways — physical activity, traffic safety and air pollution as measured by particulate matter (PM_{2.5}) [2]. ITHIM uses relative risks and burden of disease to estimate avoided illnesses (as measured by disability adjusted life years) and deaths for nine conditions associated with physical activity, three conditions linked to PM_{2.5} exposure, and current traffic fatality rates. A clear limitation of ITHIM is it underestimates all health benefits by restricting calculations to certain pathways and diseases.



Results from ITHIM predict that strategies for reducing GHG emissions will promote health; health benefits occur in all exposure pathways for all scenarios. Scenario A levels of investment are expected to contribute to 64 avoided premature deaths annually. Scenarios B and C would result in 98 and 133 avoided premature deaths respectively. Every 12% decrease in GHG — the difference between each successive scenario — results in an approximate 0.65% decrease in illness among diseases studied.

Physical activity

The most significant and attainable health benefit of active transportation is increased physical activity. Increased physical activity from active transportation could account for as much as 86–91% of avoided deaths and 69–84% of avoided illness resulting from implementing the CSCS project.

We can improve our region’s health and reduce premature deaths by increasing the number of people who regularly walk or bike to the library, school, work, church or store. A safe and convenient transportation system provides individuals with the flexible and healthy options they need to routinely choose more active modes of transportation. Prioritizing non-automobile users in the design and maintenance of streets increases the safety of all users and will facilitate walking, bicycling and use of public transit.

The CDC recommends 150 minutes per week of moderate physical activity for adults. Meeting this goal can increase life expectancy and reduce expensive and debilitating diseases. Nearly half of all Oregonians do not meet this recommendation.

Traffic safety

Reduced GHG emissions through lower per capita vehicle miles traveled (VMT) results in fewer overall traffic fatalities and injuries. Scenario A results in one avoided traffic fatality per year and decreases disabilities from serious injuries (measured by disability adjusted life years or DALYs) by 2.0%. Scenario C would help avoid 12 traffic fatalities and 12.5% of DALYs from serious injuries a year.

Due to the increase in miles covered in active transportation modes, ITHIM shows the absolute numbers of pedestrian and bicycle fatalities will rise even as the rate decreases due to population growth. While physical activity benefits outweigh the risks of active transportation, effort should be made to mitigate traffic hazards for pedestrians and cyclists through traffic calming, street design and mode separation. Efforts should also be made to capture the 53% of ‘interested but concerned’ individuals in the region who would like to bike, but are worried about safety issues.

Air quality

Improved air quality is an important benefit of addressing GHG. Metro is targeting aggressive GHG emission reductions of 12, 24 and 36% for Scenarios A, B and C respectively. However, Metro’s scenarios result in only modest PM_{2.5} reductions of 2.8, 3.2 and 3.6% due to population growth and reliance on fleet change and fuel technologies. ITHIM results predict a modest decrease in respiratory illness, heart disease cases associated with air pollution, and premature death of lung cancer patients from long-term PM_{2.5} exposure.

Portland Air Toxics Solutions Project

DEQ created the Portland Air Toxics Solutions (PATS) project to develop air toxics reduction strategies for the Portland region.

In the Portland area success has been achieved in reducing lead, carbon dioxide and ozone (smog) to meet federal clean air standards.

Despite this progress, DEQ is concerned about air toxics, which are known or suspected to cause serious health problems including cancer, nerve damage and respiratory irritation.

www.deq.state.or.us/air/toxics/pats.htm

ITHIM only incorporates long-term exposure to PM_{2.5} and may underestimate health benefits associated with improved air quality. As suggested by the Portland Air Toxics Solutions Project, additional benefits may accrue from lower ambient ozone and air toxic concentrations.

There is no safe level of PM_{2.5} exposure and current average concentrations of ozone are above safe levels. Episodic PM_{2.5} (winter) and ozone (summer) events require regional solutions such as leading public efforts to change travel behavior in order to minimize health risk. Poor air quality can be localized and many vulnerable populations live near transportation corridors. Care should be taken to influence increased physical activity while minimizing exposure when designing active transportation facilities and adjoining transportation corridors.

Recommendations

Climate change poses a risk to the future health of Oregonians. Proposed strategies to mitigate climate change will also increase health benefits associated with physical activity, traffic safety and improved air quality. Based upon the findings of this report and with the support of the CCC HIA Advisory Committee, PHD has developed a series of recommendations to preserve and promote healthy communities throughout the region.

By developing and implementing a preferred scenario that meets or surpasses the GHG emissions reduction target set by the Department of Land Conservation and Development, PHD anticipates an improvement in public health.

The majority of health benefits from the CSCS Project can be attributed to active transportation such as walking and biking to work, transit, school and community destinations. **Based on this evidence, this HIA recommends that Metro maximize opportunities for active transportation for all communities by:**

- Adopting and identifying stable funding for the design elements listed in the subsection ‘Complete Streets and Active Transportation Investments’ of Scenarios B and C: street connections, wider sidewalks, safer street crossings, improved bus stops, bikeways, transit signal priority, and on-street bicycle facilities and trails.
- Improving transit service miles to meet levels recommended in Scenario C.
- Using an equity analysis to plan and develop equal access to active transportation throughout the region.

While the benefits of physical activity far outweigh the risks, active modes of transportation can lead to increased exposure to traffic injury and air pollution. **In order to reduce the risk of increased exposure to traffic injury and air pollution for all road users, this HIA recommends that Metro prioritize the design and maintenance of non-automobile facilities by:**

- Including safety features for pedestrians and bicyclists, such as separation from motorized traffic, when possible. Prioritize non-automobile users in design and maintenance of streets.

- Providing a parallel bicycle route one block removed from high-volume roads where feasible to reduce exposure to localized pollution while still maintaining access to community destinations.

Per capita VMT reduction is expected to modestly improve air quality as measured by many pollutants including air toxics, but temporal and localized air quality concerns remain. **Due to temporal and spatial air quality concerns, this HIA recommends that Metro maximize overall improvements in air quality through actions such as:**

- Aligning the CSCS preferred alternative to PATS goals. In collaboration with DEQ, determine how the preferred alternative helps meet Oregon’s adopted ambient benchmark concentrations.
- Reducing exposure by using zoning and incentives to improve indoor filtration systems in new buildings along transportation corridors.
- Convening a regional committee to further address episodic air quality events. Solutions should be season specific and could promote incentives for short-term, alternative commute arrangements.

Finally, to improve health equity, this HIA recommends Metro ensure social and health goals are considered when prioritizing investments by:

- Explicitly and transparently addressing how investment links low-income and other vulnerable households to health-promoting resources.

INTRODUCTION

Health can be defined as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” [3]. A health impact assessment (HIA) is a way to explicitly consider how a policy or plan facilitates a healthy community before a final decision is made. The objective, evidence-based information provided by the HIA can be used to inform public decisions to increase positive health effects and mitigate unintended health impacts. In this case, the HIA looks at how Metro’s Climate Smart Communities Scenarios (CSCS) Project may affect the health of people in the Portland metropolitan region.

The 2009 Oregon Legislature required the Portland metropolitan region to develop a plan to reduce per capita greenhouse gas emissions (GHG) from cars and small trucks by 20 percent below 2005 levels by 2035. The Public Health Division of the Oregon Health Authority (PHD) supports statewide efforts to reduce GHG because curbing climate change is a critical public health issue. There are many ways to reduce emissions while creating healthy, more equitable communities with a vibrant regional economy. The goal of this HIA is to help provide information on which strategies are most health protective and what potential solutions may be when strategies have unintended health consequences.

To meet reduced GHG benchmarks, Metro is targeting fewer per capita single-occupancy vehicle (SOV) trips and vehicle miles traveled (VMT) by increasing land use and transportation investments. The CSCS Project is focused on meeting the emission target by investing in communities and providing services and shopping near where people live, improving transit service, using technology to manage traffic flow, building a well-connected network of complete streets and providing safer routes for walking and biking.

Metro is also considering impacts on public health, the economy, the environment and equity as part of the planning effort. Transportation investments and land use affect health in important ways. Many of the planned investments and actions have been shown to increase walking, biking and use of transit and reduce how often and how far people drive to meet their everyday needs. This will likely add 20–30 minutes of additional daily physical activity for individuals who shift to more active modes, greatly reducing the physical inactivity disease burden.

The primary health benefit associated with reducing GHG through the CSCS Project is increased physical activity and associated positive health outcomes. The reliance on active transportation to decrease GHG provides the bulk of the health benefits; the final plan could maximize health returns by

The final plan could maximize health returns by increasing access and reducing barriers to biking, walking, and transit.

increasing access and reducing barriers to biking, walking, and transit. This HIA also found the proposed investments and action to reduce GHG could result in decreased cancer, cardiovascular and respiratory burden from cleaner air and decreased traffic injuries from managing congestion.

PROJECT OVERVIEW

Metro's Climate Smart Communities Scenario Project

This HIA informs Phase 3 of Metro's Climate Smart Communities Scenario (CSCS) project which will help choose the best investments and policies to reduce GHG emissions in the Portland metropolitan region. The plan includes strategies that will result in fewer per capita vehicle miles traveled (VMT) by gasoline-powered, light-duty vehicles (LDV). The HIA analyzed expected health benefits associated with reductions in per capita VMT and accompanying improvements in air quality and traffic conditions.

Metro's planning efforts are directed by a series of Oregon legislative mandates and administrative rules. The 2007 Oregon Legislature passed HB 3543 establishing statewide goals to reduce GHG emissions, calling for a reduction of 10% under 1990 levels by 2020 and 75% by 2050. These goals apply to all sectors, including energy production, buildings, solid waste and transportation. In 2009, the Oregon Legislature enacted HB 2001, a broad-based transportation bill that directed Metro to develop a preferred scenario to reduce GHG emissions from LDV while accommodating planned population and job growth. HB2001 also requires Metro to adopt the preferred scenario following public review and for local governments to implement the preferred scenario through local transportation and land-use plans. As a result of these legislative mandates, the Oregon Land Conservation and Development Commission (LCDC) set LDV GHG emissions reduction targets for each of Oregon's six largest metropolitan planning areas in June 2011. The Portland metropolitan area target calls for a 20% reduction below 2005 levels. This reduction is in addition to those expected from cleaner fuels and more fuel-efficient vehicles. A second LCDC rule-making effort in November 2012 required Metro to adopt a preferred scenario by December 31, 2014.

To meet the legislative mandates and administrative deadlines, Metro has developed a three-phase process to analyze transportation and land use strategies while engaging the broader community including both citizens and policy makers of local governments, state agencies, port commissions and transit providers. During 2011, Phase 1 tested 144 different scenarios with the help of stakeholder organizations. The results of PHD engagement in Phase 1 are found in the CSCS HIA, released in April 2013[4]. The CSCS HIA quantitatively analyzed six 'representative' scenarios for three health pathways: physical activity, air quality and traffic safety. This analysis showed proposed investments, policies and actions that reduce GHG emissions also reduce VMT, providing important health benefits in all three areas studied. Physical activity accounts for the majority of health benefits in all six scenarios due to the shift to more active modes of transportation.

In Phase 2, which began in 2012, Metro narrowed and refined the 144 different scenarios through extensive modeling, down to three alternative approaches. Scenario A assumes implementing adopted plans with existing revenues and essentially represents a low-investment scenario. Scenario B relies on increased revenues to fund priority investments, reflecting full implementation of the adopted Regional Transportation Plan. Scenario C assumes additional policy and infrastructure investment beyond current adopted plans and would require even more revenue and new funding sources. Scenario C includes

significant improvements to transit service across the region. All three scenarios assume there will be advancements towards cleaner fuels and more fuel-efficient vehicles.

In 2013 Metro released the results of Phase 2 of the CSCS project and has transitioned into Phase 3 – Community Choices. In Phase 3, Metro is seeking input from community and business leaders, local governments, state agencies and the public to determine which investments and actions should be included in a preferred scenario. Metro anticipates defining the draft preferred scenario in late spring 2014, with opportunities for public input in the fall of 2014. The Metro Council is scheduled to consider adoption of the preferred scenario in December 2014.

PHD and Metro agreed that a follow-up HIA, the Community Climate Choices HIA (CCC HIA), was necessary to better inform Metro and its partners in the selection of a final scenario. The CCC HIA provides additional information for Phase 3 decisions through a health-based analysis of the three scenarios developed in Phase 2. The HIA integrates an extended literature search with an update of the quantitative modeling as recommended by the previous HIA.

Climate, transportation, and public health

Climate impacts our health in many ways. Climate change-related events that may adversely affect public health include drought and reduced water supply; extreme heat; wildfires; extreme precipitation and flooding; severe winter storms; worsening air quality due to ozone pollution; decreased frost that leads to changes in vegetation patterns and longer growing seasons; and increases in vector- or insect-borne diseases. To mitigate the effects of climate change, many communities are implementing plans and policies that will reduce GHG emissions [1].

Addressing changing climate through land use and transportation investments, policies and actions has long-term health implications. This approach includes designing communities and streets to make walking, biking, and expanded transit service more safe and convenient. Creating communities that reduce barriers to walking and biking will increase the proportion of Portland metropolitan residents who are able to meet physical activity will increase heart health, reduce body mass index (BMI) and decrease risk for many chronic diseases.

Cancer and heart disease are currently the top two “underlying causes of death,” accounting for 48% of all deaths in Oregon[6]. This reflects a larger trends of chronic disease such as heart disease, Type II diabetes and cancer surpassing communicable and infectious disease as the primary cause of mortality (death) and morbidity (illness) in high-income countries such as the U.S.

Rank (out of 43)	Risk factor
1	Tobacco smoking (including second-hand)
2	High BMI
3	High blood pressure
4	High fasting glucose
5	Physical inactivity and low physical activity
6	Diets low in fruits
7	Alcohol use
8	Diet low in nuts & seeds
9	High cholesterol
10	Drug use

Source: Global Burden of Disease Study, 2010[5]

Behaviors linked to these chronic diseases, such as tobacco use, physical inactivity, poor diet, and alcohol and drug use have been identified as top risk factors for illness and death in Canada and the United States[5] (Table 1).

Screening and scoping with the advisory committee

In 2011, PHD was awarded a three-year grant through the CDC's Healthy Community Design Initiative. As part of this grant, PHD agreed to perform three HIAs to explore how to best integrate health considerations into transportation and community planning decisions. The PHD program prioritizes performing HIAs on regional or state-wide transportation and community planning decisions and relies heavily on consultation from a diverse set of multi-disciplinary stakeholders in the form of an advisory committee.

Health Impact Assessment (HIA) begins with a process of scoping with the advisory committee; through scoping, the specific pathways and health conditions of concern are identified and prioritized. The scope of this HIA was influenced a great deal by the previous CSCS HIA addressing Phase 1, which identified increased physical activity, traffic safety and cleaner air as potential ways that the final plan could affect health. It was clear that GHG emission reductions achieved by walking and biking to work and transit would result in significant health benefits through increased physical activity. As people drive less, they are less likely to be involved in traffic collisions. Driving less will also result in cleaner ambient air. These three pathways were addressed in the CSCS HIA released in April 2013.

In the CSCS HIA, PHD used the ITHIM model to help understand the relative impact of the three exposure pathways: physical activity, traffic safety, and air pollution as measured by PM_{2.5} [2]. The ITHIM modeling assumed six scenarios representative of the 144 scenarios under consideration in Phase 1. ITHIM used information about the relative risk of 13 diseases given exposure to two types of inputs provided by ODOT's GreenSTEP model: measures of miles traveled by mode and particulate matter (PM_{2.5}) as an indicator of air quality¹. Results indicated that physical activity is the dominant pathway to health benefits. One of the recommendations of the CSCS HIA was to "carry out additional quantitative health impact assessment of the three scenarios that are identified for further evaluation in spring 2013 to further inform development and adoption of a final preferred scenario."

In early summer 2013, PHD and Metro followed that recommendation and began a second HIA – the Community Climate Choices HIA (CCC HIA) – to better inform Metro and its partners in the selection of a final scenario by December of 2014. To guide the CCC HIA, PHD reconvened 38 regional experts in land use and transportation planning, local governments and public health to help develop the CCC HIA in September 2013. See Appendix B for complete list. PHD held a series of small group and agency-specific

¹ ITHIM is limited to modeling pathways with known risk ratios: nine diseases linked to physical activity, traffic injuries and fatalities, and three diseases linked to PM_{2.5} exposure. Please see Appendix E for more information about ITHIM methodology and limitations.

conversations in addition to full advisory committee meetings in order to maximize participation opportunities in the CCC HIA:

- June 19, 2013: Metro project review and HIA screening with Community Choices program staff.
- August 29, 2013: Meeting with DEQ Air Toxics program staff to discuss air quality questions and concerns raised during the CSCS HIA.
- September 19, 2013: First advisory committee small group conversation to discuss monetization options and finalize the HIA scope (12 participants).
- October 17, 2013: Second advisory committee small group conversation to review initial air quality findings and discuss equity implications (8 participants).
- October 31, 2013: Third advisory committee small group conversation to review initial land use findings and discuss equity implications (11 participants).
- November 12, 2013: Meeting with full advisory committee to review assessment findings, discuss framing considerations and develop draft recommendations (25 participants).

The advisory committee provided feedback on the areas and methodologies of the assessment, initial findings and draft recommendations. Advisory committee members who were unable to attend meetings were encouraged to provide input electronically throughout the process.

Parameters were determined by the scenarios defined by Metro: the analysis uses 2010 as the base year and 2035 as the horizon; geography² considered is the Portland metropolitan region within the Urban Growth Boundary, and the three scenarios match those of Phase 2 of Metro's project. Baseline for quantifying health effects applies 2010 prevalence of illness or death to projected 2035 population figures.

The scope of the CCC HIA also incorporates three additional areas of concern that surfaced during the CSCS HIA and CCC HIA processes. First, several advisory group members expressed an interest in expanding the air quality analysis beyond ITHIM's treatment of PM_{2.5}. In response, PHD undertook an additional literature review of transportation-

CCC HIA Scope

Geography: Portland, Oregon metropolitan region within the Urban Growth Boundary

Timeline: 2010 (base year) to 2035 (horizon year)

Metro Scenarios - adopted local and regional plans with:

A: existing revenues

B: increased revenues from existing sources

C: new plans, policies and revenue sources

Exposure pathways: physical activity, traffic safety, air quality, land use

Quantitative tool: Integrated Transportation Health Impact Model (ITHIM)

Other considerations: magnitude of health costs associated with health pathways, vulnerable populations

² Metro used ODOT's GreenSTEP model for air quality; this regional model does not account for changes in Vancouver, WA emissions. In some instances in the report, health data is reported in a different geography such as 3-county or MSA (7-county); when an alternative to the UGB is used, it is clearly indicated in the tables and text.

related air quality health science. This included exploring other criteria pollutants and air toxics for inclusion in ITHIM as well as understanding both long and short-term exposures to transportation-related air pollution. While data and methodological limitations did not allow for complete integration of these other air pollution concerns, the air quality literature in this HIA has been expanded to discuss these pathways.

Second, many advisory group members expressed an interest in directly analyzing land use strategies within the plan. After an extensive literature review, this HIA includes a section devoted to understanding how the specific land use and transportation strategies may affect health.

Finally, advisory group members and decision makers expressed an interest in understanding the magnitude of saved costs associated with health benefits. Methodological limitations make a global number impossible to compute, but this HIA contains information about the costs of diseases of interest throughout the report.

Methods

HIA is guided by practice standards established by the Society of Practitioners of Health Impact Assessment (SOPHIA). This HIA adheres to the HIA Minimum Elements established by the North American HIA Practice Standards Working Group (Appendix A).

HIA begins by assessing the state of the science for pathways of interest with in-depth literature reviews. PHD maintains a robust database of 348 journal articles, scientific reports, and government guidance linking the built environment to health. In order to address the specific nature of this planning exercise, this database was updated by performing GoogleScholar, Pubmed, and ScienceDirect searches for literature specific to the pathways since 2008: [health] AND [physical activity, safety, and air pollution, land use]. Particular weight was given to systematic reviews, government guidance, and/or articles addressing sub-populations with vulnerabilities such as children, elders, and racial-ethnic minorities.

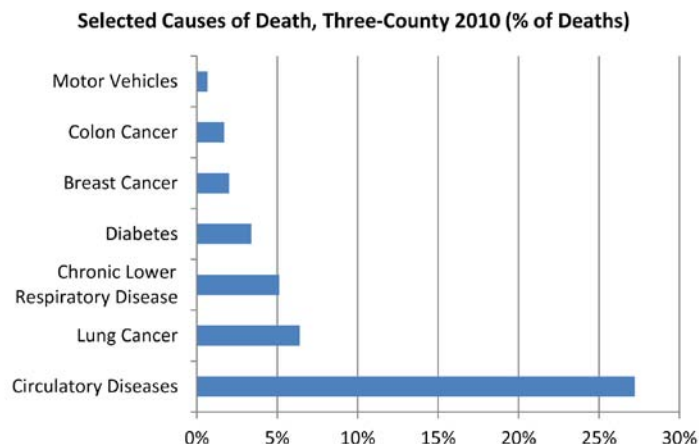
An important objective of HIA is documenting current health conditions. PHD used state and federal databases to characterize current prevalence and incidence rates. Information about costs associated with health impacts come from a combination of reports from partner state agencies and CDC's Chronic Disease Calculator, v2.0. <http://www.cdc.gov/chronicdisease/resources/calculator/>

This HIA also quantitatively modeled health impacts using ITHIM for physical activity, traffic safety, and air quality as measured by PM_{2.5}. ITHIM uses current and local burden of disease estimates and applies relative risks or measures of expected changes in exposure to estimate changes in mortality (deaths) and illness (as measured by disability adjusted life years or DALYs). ITHIM calculates mortality and illness for both baseline and each scenario (A, B, and C as defined by Metro in Phase 2); outputs are generally reported in the difference between baseline and scenario. Conceptually, baseline in ITHIM is the expected number of deaths and illness given the current rate of exposure for the expected population in

2035. Estimated impact is thus the difference between the expected outcome at baseline and the scenario. More information is available about ITHIM methodology in Appendix E.

CURRENT HEALTH CONDITIONS, RISK FACTORS, AND COSTS

Approximately 11,050 people died in the three-county area (Clackamas, Multnomah and Washington counties) in 2010. Of those deaths, at least 42% were from causes that may be impacted by this plan. For example, primary cause of death statistics for the area indicate nearly one-quarter of deaths are from circulatory disease (heart and strokes), another 11% are from chronic respiratory diseases or lung cancer, and at least 3% of death certificates list



diabetes as a primary cause[5]. All other causes, or 58% of deaths, are caused by conditions not directly tracked in the HIA but are likely to improve with implementation of the plan. Approximately one third of the ‘other’ category (and approximately 20% of the overall total) are cancers with less direct links to physical activity or air-pollution.

Underlying conditions erode quality of life for many individuals. Table 2 on the following page provides Oregon and Portland MSA³ prevalence rates for chronic conditions and associated risk factors as estimated from the CDC’s *Behavioral Risk Factor Surveillance System Survey* (BRFSS) in 2011[8]. According to BRFSS, approximately 3% of adults in the region have survived a heart attack, a similar number suffer from chest pain or heart disease and 2.7% report having survived a stroke. These three cardiovascular conditions are highly associated with risk factors such as physical inactivity, high blood pressure, high cholesterol, and high BMI (weight). Recent BRFSS data also shows that approximately 28% of adults report high blood pressure and 36% have had a high cholesterol reading in the past 5 years. Nearly 40% of adults report not meeting the recommended 150 minutes of aerobic physical activity per week. Over 35% are overweight and nearly 24% are obese[8].

Respiratory illness significantly degrades quality of life. Poor air quality contributes to conditions such as asthma and chronic obstructive pulmonary disease (COPD). A little more than 5% of adults report having COPD. Over 9% of Portland region adults report a current asthma condition; the Oregon adult rate is the sixth highest rate in the country [8, 9]. At least 7–8% of children in Oregon have asthma according to parental response and when teens are directly surveyed, the prevalence increases to 10% [9].

³ The Portland-Vancouver-Hillsboro OR-WA MSA is defined as the seven county region including Clackamas, Columbia, Multnomah, Washington, and Yamhill Counties in Oregon, and Clark and Skamania Counties in Washington

Table 2. Adult prevalence rates for chronic disease and associated risk factors [8]

BRFSS 2011 category	U.S. state median	Percent of adults [95% Confidence Interval]	
		Oregon	Portland MSA ⁴
Heart attack	4.4	3.6 [3.1-4.2]	3.2 [2.5-4.0]
Chest pain or coronary heart disease	4.1	3.6 [3.1-4.0]	3.1 [2.4-3.7]
Stroke	2.9	2.9 [2.5-3.4]	2.7 [2.1-3.3]
Any physical activity last month?	73.8	80.3 [78.7-81.3]	81.5 [79.5-83.6]
150 minutes of aerobic per week	57.7	61.1 [59.3-62.9]	60.3 [57.8-62.8]
High blood pressure	30.8	29.9 [28.5-31.3]	27.9 [26.0-29.9]
Cholesterol checked and high in past 5 years	38.4	38.5 [36.8-40.2]	36.1 [33.8-38.5]
Overweight	35.7	34.8 [33.31-36.4]	35.8 [33.4-38.1]
Obese	27.8	26.7 [25.2-28.3]	23.7 [21.7-25.7]
Diabetic	9.5	9.3 [8.4-10.2]	8.5 [7.3-9.8]
Depression (ever treated)	17.5	23.9 [27.5-25.3]	22.8 [20.8-24.7]
COPD (Chronic obstructive pulmonary disease)	6.1	5.9 [5.2-6.7]	5.2 [4.2-6.3]
Ever had asthma	13.6	16.7 [15.4-18.0]	16.2 [14.3-18.0]
Current asthma	9.1	10.5 [9.4-11.5]	9.6 [8.2-11.0]

Chronic conditions are a significant financial burden to households and taxpayers. While Oregon-specific cost data are sometimes difficult to calculate, the CDC provides a Chronic Disease Cost Calculator to estimate state-specific Medicaid (Oregon Health Plan), Medicare, and private insurance expenditures for the treated population in any given year. The tool estimates annual direct medical costs in 2010 dollars and does not include lost wages, reduced productivity or years lost to premature death. It does minimize double counting across categories by statistically controlling for deaths with more than one cause, also called comorbidity [10]. Additional information about assumptions, data sources and modeling techniques can be found in Appendix D.

⁴ Data at this level of geography is age-adjusted and can be compared to other MSAs and the State.

Table 3 displays the estimated expenditures on chronic disease in Oregon, adjusting the costs for proportion of population living in the three-county area. More than \$1.5 billion dollars is spent each year on cardiovascular disease in the region. Fifteen percent of Oregon’s population are Medicaid recipients and 14%, including some that also qualify for Medicaid, are Medicare recipients [11]. Of the \$1.5 billion spent each year on cardiovascular disease, \$623 million of that cost is borne by the taxpayer in Medicaid and Medicare payments and at least \$481 million is paid by private insurance. The cost incurred in 2010 by all payers for maintenance and complications from diabetes is estimated at \$710 million, asthma cost \$176 million and depression, which is helped by physical activity, cost \$382 million [10].⁵

Table 3. Estimates of 2010 three-county annual expenditures (in 2010 \$mil) for select chronic diseases

	Medicaid	Medicare	Private insurers	All payers ¹
Total cardiovascular disease²	\$120	\$503	\$481	\$1,551
Chronic heart failure	\$12	\$31	\$10	\$78
Coronary heart disease	\$12	\$167	\$189	\$470
Hypertension	\$47	\$149	\$197	\$592
Stroke	\$48	\$120	\$63	\$356
Other heart disease	\$30	\$106	\$68	\$258
Diabetes	\$59	\$199	\$226	\$710
Asthma	\$34	\$39	\$66	\$176
Depression	\$22	\$80	\$157	\$382

Source: CDC Chronic Disease Calculator, v2.0[10]

(1) All payers is estimated separately and may not equal the sum of Medicaid, Medicare, and private insurers.

(2) Total cardiovascular disease is a summation of the listed conditions, but only includes a portion of hypertension to avoid double counting. Similarly, diabetes complications can lead to cardiovascular disease; summing cardiovascular disease and diabetes would result in double counting. All other categories statistically control for listed conditions as well as common diseases not listed.

According to the CDC, more than \$1.5 billion dollars is spent each year on cardiovascular disease in the region. Almost half of that cost is borne by taxpayers.

⁵ The Chronic Disease Cost tool also provides projected costs; it estimates that expenditures for cardiovascular disease will increase by 79%, asthma by 66%, and diabetes by 77% by 2020 after accounting for inflation.

FINDINGS: ITHIM – Overview and results

ITHIM was identified in the CSCS HIA as a way to quantify morbidity (illness and injuries) and mortality (death) related to transportation changes. ITHIM was developed by public health researchers in the UK to assess potential health impacts of GHG reductions at a regional level by using population-based disease burden information for 13 different conditions in three potential pathways: physical activity, traffic safety (injuries and fatalities), and air quality [2].

Health outcomes in ITHIM include premature mortality (death) and morbidity (illness). Mortality data is based on burden of disease — specifically the relative risk of a disease given a change in exposure — associated with physical activity, traffic crashes, and air quality. The last time ITHIM results were released for the CSCS HIA, mortality data was based on U.S. risks. To improve accuracy of the model, mortality data for this HIA was based on Oregon-specific risks using 2010 vital statistics [12].

For morbidity, ITHIM calculates disability adjusted life years (DALYs) from the World Health Organization’s (WHO) burden of disease database. DALYs are the sum of years of life lost (YLLs) and years living with a disability (YLDs). The YLL component of DALYs in ITHIM was revised using mortality rates from the Oregon Public Health Assessment Tool (OPHAT). Average mortality counts for 2008–2010 were extracted from OPHAT for the transportation related illnesses addressed in ITHIM and entered into the DALY Calculation Template from WHO (http://www.who.int/healthinfo/global_burden_disease/tools_national/en/) to revise YLL. YLD values were imputed from the United States burden of disease for the population of Oregon and entered into the ITHIM.

Table 4. ITHIM data inputs

Data Input	Baseline (2010)	Scenario A Adopted plans with existing revenue	Scenario B Adopted plans with increased revenue	Scenario C Scenario B plus additional policy/ infrastructure and new funding sources	Data source and notes
Reduction in GHG		↓12%	↓24%	↓36%	Modeled using ODOT’s GreenSTEP. GreenSTEP inputs include Metro’s Household Activity Survey, monitored PM2.5 emissions rates from DEQ.
Vehicle miles traveled (VMT) per person per week	134	125	117	102	
Distance by mode ¹	Walk=1.0% Bike=1.6% Bus=0.21% Car=97.2%	Walk=1.3% Bike=1.7% Bus=0.16% Car=96.7%	Walk=1.5% Bike=2.6% Bus=0.21% Car=95.6%	Walk=1.8% Bike=3.5% Bus=0.39% Car=94.2%	
PM _{2.5} (µg/m ³)	6.6317	↓2.8%	↓3.2%	↓3.6%	
UGB population	1,481,118	1,954,716 (2035 Estimate)			U.S. Census

(1) GreenSTEP breaks out VMT per person per week for the modes listed. The inputs reported here have been changed to percent.

ITHIM requires a number of inputs beyond health disease burden information. Metro provided vehicle miles traveled by mode and road type and PM_{2.5} levels for each scenario. (Details are provided in Table 4.) PHD used 2010 census data for age distributions in the three-county area and outputs were increased by approximately 42% to adjust for the additional expected population by 2035.

ITHIM results are summarized in Table 5. (More detailed methodology descriptions, limitations and results are provided in Appendix E; pathway-specific results are discussed in later sections.) ITHIM shows that the current investment trajectory (Scenario A) will result in 64 avoided annual deaths in 2035 or a 0.9% drop in premature mortality given current death rates for conditions considered. ITHIM measures avoided illness through DALYs with current investment trajectories resulting in a 0.7% decrease in illness.

More aggressive investments clearly show greater reductions in disease and death. Scenario C would more than double the number of avoided annual deaths when compared to Scenario A. The 133 avoided annual deaths represent an approximate 2% reduction in current premature mortality rates with these pathways. Similarly, each additional 12% reduction in GHG from light-duty vehicles would garner the co-benefit of a 0.65% reduction in DALYs.

Table 5. Summary of ITHIM results

	Avoided	Scenario A		Scenario B		Scenario C	
		Count ¹	Percent reduction	Count ¹	Percent reduction	Count ¹	Percent reduction
Physical activity	Mortality	-58	1.4%	-89	2.1%	-116	2.9%
	DALY ²	-793	1.3%	-1333	1.9%	-1786	2.8%
Traffic safety	Mortality	-1	1.2%	-4	3.5%	-12	10.5%
	DALY ²	-72	2.0%	-173	4.9%	-443	12.5%
Air quality (PM_{2.5})	Mortality	-4	0.2%	-5	0.2%	-5	0.3%
	DALY ²	-37	0.2%	-42	0.2%	-47	0.2%
Total	Mortality	-64	0.9%	-98	1.4%	-133	2.0%
	DALY ²	-903	0.7%	-1548	1.3%	-2276	1.9%

(1) This count has been adjusted for expected population of the UGB in 2035.

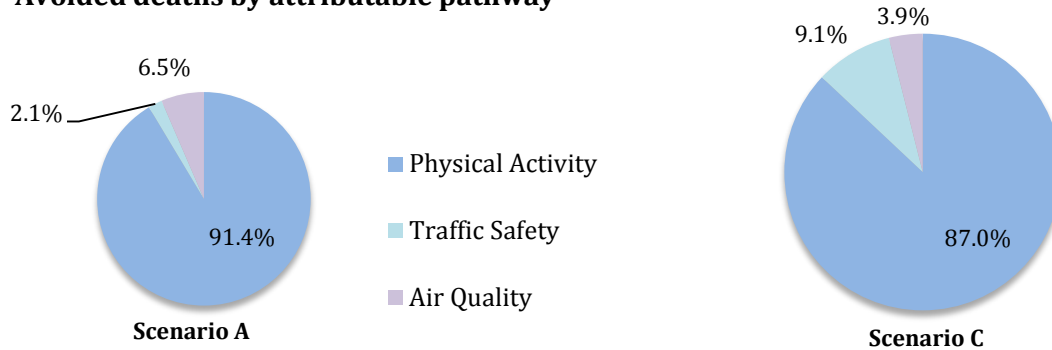
(2) Disability adjusted life years (DALY) is the summation of years of life lost (YLL) and years living with a disability (YLD) due to injury or disease. Note that YLD assumptions were not available some sub-categories and therefore significantly underestimate DALYs for physical activity and air quality.

ITHIM results also show that the majority of health benefits associated with GHG emission reductions are from increased physical activity: between 87.0–91.4% of prevented deaths and between 78.5–87.9% of prevented illness as measured by DALYs. ITHIM underestimates health benefits of all pathways; the model is limited to nine disease associated with physical activity, reported rates of collisions, and three diseases associated with PM_{2.5} as an indicator of air quality. (Please see Appendix E for expanded discussion of limitations.) Despite these

ITHIM results show that the majority of health benefits associated with GHG emission reductions are from increased physical activity.

limitations, these patterns are largely congruent with current patterns of disease burden and knowledge about active transportation addressing the large burden associated with physical inactivity.

Avoided deaths by attributable pathway



Highlights of ITHIM

- Lowering GHG emissions results in health benefits in each scenario.
- Using the strategies proposed, current levels of investment (Scenario A) would result in 64 avoided deaths annually. Scenarios B and C would result in 98 and 133 avoided deaths, respectively.
- Every 12% decrease in GHG emissions (the difference between each scenario) results in approximately a 0.65% decrease in DALYS among diseases studied.
- The vast majority of avoided deaths and illness are attributable to increased physical activity. ITHIM underestimates all health benefits by restricting to certain pathways and diseases. For example, it does not account for health benefits of decreased air toxics. However, the large contribution of physical activity is consistent with current public health knowledge of the burden of disease from inactivity.

FINDINGS: Land use

Local land use regulations and community design shape the physical environment of our region. Land use impacts how we live, work and play, and can moderate or influence healthy environments and behaviors. Zoning has historically been used to protect human health by separating noxious, polluting uses from residential areas. Contemporary trends in land use research have shown a more nuanced if complex understanding of the intersection between land use and health. For example, land use mix and density may dictate the distance and ease in traveling to health-supportive resources such as employment, school, food, and recreation. Many of the CSCS Project strategies and actions focus on the interaction between land use and transportation; for the remainder of this section, “land use” refers to this interaction.

Another way to conceptualize the impact of land use and community design is to consider how physical activity, traffic safety, and air quality may change in different land use contexts and design decisions. The design of transportation facilities within mixed-use areas can impact health in multiple ways. The width, placement and striping of bicycle lanes and sidewalks can induce or prohibit active transportation modes due to perceived safety and desirability, serve as protection from auto collisions, and impact localized concentrations of air pollutants. When schools, shopping, services, residential and employment opportunities are in close proximity, people do not have to travel as far, making walking, bicycling and transit more convenient and viable travel options.

PHD performed a literature⁶ review in order to understand the links between health and the specific land use strategies being considered. A summary of the literature for each land use strategy is provided in Table 6. The Magnitude of Health Impacts and Weight of Evidence columns provide a 1-5 scale (5 as the highest) to describe scientific knowledge for each pathway related to the strategy. The Magnitude of Health Impacts column reflect trends in overall burden of disease; strategies that are anticipated to have large effects on disease due to environmental and/or behavior changes were rated higher than those that will have more modest effects. The Weight of Evidence column addresses the quality and quantity of the research; ‘1’s or ‘2’s reflect conflicting or emerging research while a 5 rating reflect a robust literature drawn from meta-analyses, large epidemiological studies, and/or systematic reviews.

Although there is little literature directly linking health to the strategy, there is robust documentation of the health impacts of increased physical activity levels caused by more walking, bicycling and use of transit [13-16]. (See the Physical Activity section for more information.) Consequently, investments, policies and actions that make it more safe and convenient to walk and bike will benefit health. This is

⁶ PHD maintains a robust database of 348 journal articles, scientific reports, and government guidance linking the built environment to health. In order to address the specific nature of this planning exercise, this database was updated by performing GoogleScholar, Pubmed, and ScienceDirect searches for the following since 2008: [health, physical activity, safety, and air pollution] AND [density or sprawl, mixed-use, transportation modes, parking, and transit service]. Particular weight was given to systematic reviews and/or articles addressing sub-populations with vulnerabilities such as children, elders, and racial-ethnic minorities.

reflected in the Weight of Evidence column of Table 6 (page 22), which addresses the mode shift and health evidence separately for some strategies.

Many of the land use strategies under consideration are spatially interconnected and work synergistically. Residential density at or above levels associated with traditional single-family home urban neighborhoods is health supportive. However, the benefits of residential density require good connectivity to many diverse community destinations within walking and biking distance to encourage active transportation [17-21].

Complete streets may be the most health-promoting aspect of the investments and actions being considered.

Advisory group members repeatedly commented that land use strategies mattered a great deal. This is congruent with literature that stresses the cumulative effect of pedestrian and bicycle facilities, design, and nearby destinations in supporting active transportation options that result in increased physical activity [21-23]. These elements are addressed in the CSCS Project subsections ‘Complete Streets and Active

Transportation’ in Scenarios B and C. Complete streets may be the most health-promoting aspect of the investments and actions being considered.

Low-income households are particularly reliant on the public transportation network to access job opportunities, shopping, services and other everyday needs [24]. Due to budget constraints, low-income households often live in neighborhoods with more affordable housing that lack supportive resources such as healthy food, parks, community centers and high quality medical care. Housing location has been found to amplify negative health associated with low socio-economic status [25, 26]. These neighborhoods often lack transit services and other amenities such as safe and convenient sidewalks, bike lanes and parks. These locations may have traffic safety risks such as high volume roads or poorly designed intersections that are difficult for vulnerable populations such as children and elders to navigate [26-30]. Community design and land use strategies listed in Table 6 place health supportive resources near affordable housing options. Transportation systems, and particularly public transit, play an important role in linking low-income households to health promoting resources such as fresh food, health providers and living wage jobs [24, 26].

Transportation systems, and particularly public transit, play an important role in linking low-income households to health promoting resources such as fresh food, health providers and living wage jobs.

Highlights of land use

- Elements of residential density, land-use mix, number of nearby community destinations and street connectivity are particularly effective at encouraging active transportation. These elements also work synergistically to influence walking, biking and use of transit.
- Most of the land use strategies listed in Table 6 and included in the scenarios promote health across multiple pathways.
- Investments and actions in Scenario B and C's subsections 'Complete Streets and Active Transportation' are the most important elements in encouraging healthy behavior. These elements include street connections, wider sidewalks, safer street crossings, improved bus stops, bikeways, transit signal priority, on-street bicycle facilities and trails.
- Low-income households, in search of affordable housing, may locate in neighborhoods that lack suitable transportation options. These neighborhoods also have fewer health supportive amenities. Low-income households may need access to health supportive resources more than any other group. It is important to create and preserve affordable housing options in areas that are well served by transit.

Table 6. Summary of literature review for land use strategies in Climate Smart Community Choices, Phase 2.

Land use policy	Current levels	Scenario A/B/C	Health pathway	Magnitude of health impact (5 '+' =largest)	Weight of evidence (5 '+' =most)	Additional considerations
Households in mixed use areas	26%	36% 37% 37%	Mixed use in the presence of reasonably high residential density and a short distance from many diverse community destinations is most likely to shift transportation mode and increase physical activity [17, 19].	+++	+++++	Mixed land use should be designed for all incomes including low-income families. Design matters. For example, multi-unit apartment complexes are often a land use buffer and qualify as mixed-use. These apartment complexes need to be fully integrated for connectivity to benefit from mixed-use. Housing/workplaces along major arterials are exposed to higher concentrations of air and noise pollution.
Urban Growth Boundary Expansion	2010 UGB	+28,000 +12,000 +12,000 (acres)	UGB literature is limited; however, limiting UGB expansion increases the likelihood of community destinations near residences by encouraging a compact, urban form. There is robust support for controlling sprawl. Urban development intensity is generally health supportive because nearby available resources increase. (See mixed-use above.) Residential density leads to increased physical activity as individuals shift to active transportation modes for daily activities [31, 32].	+++	++++	Development intensity without connectivity may not result in increased physical activity. Minimizing the expansion of the UGB may put upward pressure on housing prices, potentially exacerbating patterns of low-income households located in areas with limited resources. Controlling the UGB without addressing congestion (see delay reduced by traffic management policy below) can increase commute times which negatively impacts an individual's time for health-promoting activities.

Land use policy	Current levels	Scenario A/B/C	Health pathway	Magnitude of health impact (5 '+' =largest)	Weight of evidence (5 '+' =most)	Additional considerations
Bike travel	9%	10% 15% 20%	Aggressive mode shifts to bicycles will increase physical activity and health.	++++	+++ (mode shift evidence) ++++ (health evidence)	The access, placement, and design of bike facilities must maintain perceived and real safety [33]. Placement should also be designed to minimize air pollution exposure when possible [34].
Transit service (Daily revenue miles)	73,000	80,000 87,000 159,000	Increased transit service increases physical activity [35-38] (walking to/from stops), decreases air pollution, and increases traffic safety.	+++	+++++ (mode shift evidence) +++ (health evidence)	Low-income households are more likely to depend on transit and may have less access to transit. Transportation costs may be inelastic for this group but are a larger share of the household budget, so increases in transit costs may have inequitable impacts. Similarly, these households may choose a longer commute time to find affordable housing, which erodes time available for other health promoting activities. Expansions of service should consider and prioritize reaching low-income neighborhoods.
Work/non-work trips in areas with parking management	13%/8%	No change 30%/30% 50%/50%	Parking management influences active transportation and associated physical activity [39, 40].	+++	+++++ (mode shift evidence) + (health evidence)	The potential burden of parking costs and access to alternative transportation modes for low-income households should be considered.

Land use policy	Current levels	Scenario A/B/C	Health pathway	Magnitude of health impact (5 '+' =largest)	Weight of evidence (5 '+' =most)	Additional considerations
Miles of freeway/arterials added	N/A	+9 miles	Addressing congestion leads to decreased traffic injuries and fatalities, increased time for healthy activities and decreased air pollution [41, 42].	+	++	Induced demand may erode the congestion related pathways over time.
		+81 miles	Adding road/lane miles could potentially increase connectivity by completing the system.	++	++	Health impacts of additional lanes are extremely localized and vary by project. Each project should carefully assess the impact on nearby residents and mitigate air quality, noise and physical barriers during both construction and end-use.
		+105 miles	Major roads are a significant barrier to active transportation, physical activity and social cohesion [26].	--	++++	Care should be taken in designing multi-mode improvements to maximize health when adding arterial lane miles. The literature describes mixed results from reducing congestion with additional lane-miles. Reducing congestion should reduce the number of crashes, but the crashes may be more severe due to higher speeds associated with good traffic flow.
Delay reduced by traffic management strategies	10%	No change 20% 35%	Addressing congestion leads to decreased traffic injuries and fatalities, increased time for healthy activities and decreased air pollution [41, 42].	++	+++	Addressing congestion through traffic management is a more direct route to controlling commute times versus adding arterials or freeways.) PHD recommends this strategy over additional lane miles.

FINDINGS: Physical activity

ITHIM results for physical activity clearly indicate that reductions in GHG through increased walking and biking to transit and destinations produce significant health benefits. Physical activity prompted by investments in Scenario A can be expected to help avoid 58 deaths annually by 2035. Scenario C could help avoid 116 deaths and help reduce disease burden by up to 2.8%.

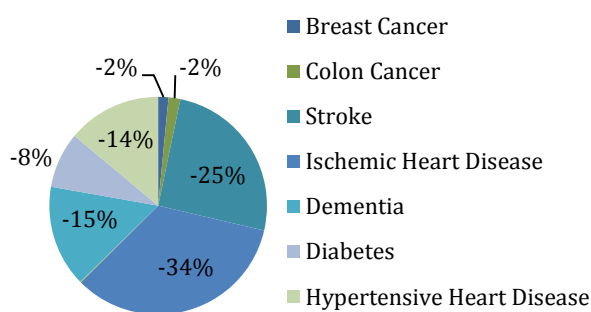
Table 7. ITHIM results attributable to physical activity

Avoided	Scenario A		Scenario B		Scenario C	
	Count ¹	Percent	Count ¹	Percent	Count ¹	Percent
Mortality	-58	1.4%	-89	2.1%	-116	2.9%
YLL	-468	1.5%	-747	2.3%	-988	3.1%
YLD	-325	1.0%	-586	1.6%	-799	2.3%
DALY ²	-793	1.3%	-1333	1.9%	-1786	2.8%

(1) This count has been adjusted for expected population in 2035.

(2) Disability adjusted life years (DALY) is the summation of years of life lost (YLL) and years living with a disability (YLD) due to injury or disease. Note that YLD assumptions were not available for some sub-categories and therefore significantly underestimate DALYs for physical activity and air quality.

Physical activity avoided deaths by disease (Scenario B)



Physical inactivity is the fifth largest contributor to the current disease burden in the U.S.[5]. A large portion of expected health benefits from the CSCS Project are attributable to physical activity: over 87% of avoided premature deaths and 78.5% of avoided years living with a disability (DALYs) in Scenario C. Activity alleviates disease and death through preventative mechanisms such as reaching and maintaining a healthy weight or body mass index, decreasing blood pressure and cholesterol, and lowering blood glucose levels to prevent diabetes [43-45]. Increasingly,

studies are showing that moderate physical activity regimens address cardiovascular disease (heart attack, chest pain, and stroke) and diabetes in a more prescriptive fashion, often performing as well as common pharmaceuticals [46].

Further analysis shows that avoided deaths and illness are largely from cardiovascular disease. In Scenario B, 73 percent of avoided deaths and 55 percent of avoided DALYs in the physical activity category are from heart disease or stroke.

Walking or biking to work, school, transit and other community destinations helps people reach the Surgeon General's physical activity recommendation of 150 minutes per week for adults and 300 minutes per week for children.

Well-functioning Transportation Systems Facilitate Choice and Physical Activity

Consider the transportation choices of an individual who lives in Troutdale and works in downtown Gresham.

Monday: Rides an 8-mile round-trip to workplace along safe and marked bike lanes.

Tuesday: Telecommutes but walks 1.5 miles by walking children to and from school and taking a break at a nearby coffee shop.

Wednesday: A child's extracurricular activity requires taking the family car. However he walks 0.75 miles to get lunch from a great sandwich shop.

Thursday: An important business meeting in downtown Portland is facilitated by taking the MAX into downtown and back to the office. After taking the bus home, he walks 1.25 miles over the course of the day to and from transit.

On Friday: Bike day! Repeat of the 8-mile round-trip bike ride.

Saturday: 3-mile round-trip family bike ride to a park for a soccer game.

Sunday: 3-mile round-trip family bike ride to church.

Assuming the commuter travels at 3-miles per hour when walking and 12 miles per hour when biking, this person has accumulated 150 minutes of physical activity for the week from travel alone.

Active forms of transportation such as walking or biking to work, school, transit and other community destinations are remarkably effective at helping individuals reach the Surgeon General's physical activity recommendation of 150 minutes per week for adults and 300 minutes per week for children [47]. New mass transit options may change daily physical activity levels, and could add 10 minutes of physical activity each day for one group of new transit users [48]. Only 60% of adults in the region currently meet the recommendation[8], suggesting active transportation investments could help a large proportion of the population begin to meet physical activity goals. Failure to meet the recommended 150 minutes of physical activity a week is estimated to reduce life expectancy by 3.4 years [16].

Transportation choices allow individuals to routinely and flexibly integrate physical activity into everyday lives. These choices are dependent upon a well-functioning and safe transportation system for all types of users. It also requires the support of a built environment that encourages active transportation through relatively high residential density featuring mixed use with many diverse, nearby community destinations anchored by high connectivity throughout the system.

An aggressive mode split change clearly drives the ITHIM physical activity results. Increasing the bike-mode split from 9% of 10-mile single-occupancy vehicle (SOV) trips in 2010 to 10, 15 and 20% in Scenarios A, B and C accounts for the majority of anticipated physical activity gains. The significant increase in transit service miles between Scenarios B and C amplifies the walking mode shift through walk trips to transit. Both strategies are critical in creating the health benefits.

Adults and children are more likely to choose active forms of transportation when they perceive they will be able to do so safely [49]. Design details and investments to make streets more complete and comfortable for potential pedestrians and cyclists are not accounted for explicitly in the ITHIM model. Complete streets and active transportation investments will be critical in implementing

aggressive mode shifts needed to reach GHG reduction targets. (See Traffic Safety section for more information about perceived safety.)

Complete streets are needed in all communities. Low-income households are more likely to live in neighborhoods with fewer amenities including pedestrian and bicycling facilities [25, 27]. Suburban communities generally have lower levels of connectivity and less dense transit service. Both low-income and suburban communities will require significant pedestrian, bicycle, and transit investments to accrue health benefits at rates similar to wealthier and more urban parts of the region.

Highlights of physical activity

- The majority of health benefits (87–91% of avoided deaths, 79–88% of avoided illness depending on scenario) are attributable to increased physical activity such as walking and biking to work, transit, school and other destinations.
- A transportation system with many safe and convenient options provides individuals with flexible and healthy choices needed to routinely shift modes from single occupancy vehicles to more active modes of transportation. Prioritizing non-automobile users in design and maintenance of streets increases the safety of all users and will facilitate transportation mode shift to walking, bicycling and using transit.

FINDINGS: Traffic safety

Reduced reliance on single-occupancy vehicles will help control congestion as the metro population continues to grow. ITHIM estimates that current levels of investment will help avoid one traffic fatality (1.2% reduction) and a 2.0% reduction in DALYs due to fewer serious traffic accidents. Scenario C results in far more aggressive traffic safety benefits with 12 lives saved and 12.5% fewer years of disability due to injuries.

Table 8. ITHIM results attributable to traffic safety

Avoided	Scenario A		Scenario B		Scenario C	
	Count ¹	Percent reduction	Count ¹	Percent reduction	Count ¹	Percent reduction
Mortality	-1	-1.2%	-4	-3.5%	-12	-10.5%
YLL	-28	-1.2%	-84	-3.5%	-251	-10.5%
YLD	-44	-3.8%	-89	-7.6%	-192	-16.4%
DALY	-72	-2.0%	-173	-4.9%	-443	-12.5%

(1) This count has been adjusted for expected population in 2035.

(2) Disability adjusted life years (DALY) is the summation of years of life lost (YLL) and years living with a disability (YLD) due to injury.

The U.S. Department of Transportation (DOT) provides guidance in valuing prevented traffic fatalities. The current default value of statistical life (VSL) – a measure that aggregates many individuals’ willingness-to-pay for a small reduction in mortality risk – is \$9.1 million (in 2012 dollars) with a range of \$5.2–\$12.9 million provided for sensitivity analyses [50]. DOT also provides guidance about valuing injuries through an Abbreviated Injury Scale (AIS). Developed in the 1970s, AIS uses a QALY-based system to divide all possible injuries from crashes into a six-category scale of severity with the top severity being death. Current levels range (in 2012 dollars) from \$27K for a minor laceration injury to \$5.4 million for a critical injury such as ruptured liver [50]. There are no clearly established methods to convert DALYs to QALYs in order to apply AIS to ITHIM results.

The modeling indicates a reduction of LDV VMT per person on all types of roads with an increase in bicycle and pedestrian miles on minor streets and arterials. Even though overall traffic safety will improve, the increase of bicyclists and pedestrians on minor streets and arterials results in an increase in the absolute number of accidents for these two modes. The model predicts 2.5 more pedestrian deaths and 1.3 more bicyclist deaths in Scenario B in 2035. Since Scenario B also predicts 7.9 fewer automobile and motorcycle deaths, the overall fatality outcome is a net benefit of 4.0 avoided deaths. Patterns are similar for serious injuries and other Scenarios.

Table 9. ITHIM traffic safety results by mode for Scenario B

Mode	Annual fatalities			DALYs ¹		
	Baseline	Scenario B	Difference	Baseline	Scenario B	Difference
Walk	34.3	36.7	2.5	889.2	952.8	63.6
Cycle	10.4	11.7	1.3	316.7	356.7	40.0
Bus	0.0	0.0	0.0	0.0	0.0	0.0
Car	53.4	45.9	-7.5	1905.8	1639.5	-266.2
HGV	0.8	0.8	0.0	19.1	19.1	0.0
Motorbike	15.9	15.6	-0.4	424.5	413.9	-10.6
Total	114.8	110.7	-4.0	3555.4	3382.0	-173.3

(1) Disability Adjusted Life Years (DALYs)

This uneven distribution of benefits by mode may seem counterintuitive to studies that suggest a ‘safety in numbers’ effect. The safety in numbers effect is that as the proportion of pedestrians or bicyclists increases to a critical mass, motorized vehicle drivers become trained to ‘look’ and account for the non-motorist users, resulting in fewer collisions. The effect has been documented internationally and evidence is starting to appear in popular bicycling regions in the U.S. [33, 51-53]. While ITHIM allows for a safety in numbers adjustment, PHD did not exercise the safety in numbers option because it is unclear how to quantify the effect. The model also does not take into account infrastructure investments that may increase future bicyclist safety through increased visibility and separation from motorized traffic.

The physical activity benefits far outweigh the traffic risks associated with active modes of transportation [54-56]. One European study found that cycling instead of driving resulted in life-expectancy gain of 3–14 months over the course of a lifetime, far outweighing the potential risk of inhaled air pollution (0.8–40 days lost) and the risk of traffic accidents (5–9 days lost) [55].

The traffic safety results still indicate a need for safe strategies for pedestrians and bicyclists. The most effective way to increase safety for pedestrians and cyclists is through traffic calming measures and greater physical separation from motorized traffic [57-60]. Pedestrians, especially older adults, seem particularly sensitive to the location of sidewalks [61-63]. Bicyclists fare better on minor side roads than in unseparated bike lanes on major roads and benefit greatly from bicycle-specific facilities [53, 64].

The physical activity benefits of biking and walking far outweigh the traffic risks.

Perceived safety is a leading reason for individuals to avoid more active forms of transportation. Parental perceptions about perceived safety are predictive of children walking and biking to school [65, 66]. Bicyclists also respond to perceived safety. A recent study in the Portland region indicates 60% of Portlanders and 53% of the rest of the region are ‘interested but concerned’ about cycling. This potential ‘market’ of cyclists is far more worried about traffic safety than current cyclists; 84% are concerned about being hit by a car compared with 39–52% of ‘enthused and confident’ or ‘strong and fearless’ cyclists [67].

The cumulative effect of design strategies, investments and policies to address safety may serve as an indicator that streets are safe for all modes and thus help increase the number of pedestrians and bicyclists [40].

Highlights of traffic safety

- Traffic safety is an important co-benefit of reducing GHG emissions. Scenario A would result in one avoided traffic fatality per year and decrease serious injuries by 2.0%. Scenario C would help avoid 12 traffic fatalities and decrease serious injuries by 12.5% a year.
- The shift in transportation modes results in an increase in the absolute numbers of pedestrian and bicycle fatalities, even as the rate decreases. Even though the physical activity benefits far outweigh the risks of active transportation, this suggests extra effort should be made to mitigate traffic hazards for pedestrians and cyclists through traffic calming, street design and mode separation when possible.
- Fifty-three percent of individuals in the region are 'interested but concerned' about cycling. Addressing perceived safety for pedestrians and cyclists will help implement large mode shifts.

FINDINGS: Cleaner Air

Improving overall air quality is an important health benefit of GHG reduction. Reducing per capita VMT combined with clean fuel technologies are expected to decrease air pollutants attributable to light-duty vehicles. These pollutants include: PM_{2.5}, ozone precursors and air toxics such as benzene, 1, 3-butadiene, arsenic and chromium VI. Reductions of these pollutants would likely result in increased respiratory health, decreased cardiovascular events such as heart attacks, and decreased cases of cancers such as lung cancer and leukemia. Additionally, some populations are at greater risk from exposure to air pollution. For example, people with lung cancer have an increased risk of death when exposed to increased levels of PM_{2.5}.

To quantify the health impacts of cleaner air, ITHIM developers chose PM_{2.5} as the pollutant indicator for mobile, onroad sources. PHD accepted this choice of pollutant based on the scientific consensus about the strength of and causal nature of the relationships between PM_{2.5} and health. The periodic reviews of pollutants commissioned by the EPA [68-70] and a recent World Health Organization [71] scientific review all suggest that PM_{2.5} is the best air pollution indicator for health-impact analyses. Using PM_{2.5} as the exposure pollutant in ITHIM does underestimate some health effects including some cancer risks^{7,8}.

The PM_{2.5} inputs for ITHIM were modeled by Metro in ODOT's GreenSTEP. Metro's scenario analyses showed a decrease in annual concentration of particulate matter as measured by PM_{2.5} of 2.8% (Scenario A) to 3.6% (Scenario C). This is expected to result in modest decreases in deaths and illness (Table 10), primarily from fewer respiratory illnesses, reduced heart disease related to air pollution and reduced lung cancer mortality related to long-term PM_{2.5} exposure.

Table 10. ITHIM results attributable to air quality (PM_{2.5})

	Scenario A		Scenario B		Scenario C	
	Count	Percent reduction	Count	Percent reduction	Count	Percent reduction
Mortality	-4	0.2%	-5	0.2%	-5	0.3%
YLL	-37	0.2%	-42	0.2%	-47	0.3%
YLD	0	0.0%	0	0.0%	0	0.0%
DALY	-37	0.2%	-42	0.2%	-47	0.2%

(1) This count has been adjusted for expected population in 2035.

(2) Disability adjusted life years (DALY) is the summation of years of life lost (YLL) and years living with a disability (YLD) due to illness. YLD are unavailable for respiratory and air pollution-related cardiovascular disease as well as lung cancer at this time.

⁷ For more information on cancer risks associated with light-duty vehicles in the Portland region please see Portland Air Toxics efforts [74].

⁸ Limitations are discussed in greater detail below and found in the discussion of ITHIM methodology in Appendix E. A more detailed discussion of potential air pollutants of interest and the current scientific understanding of health linkages is available in Appendix F.

The modest effect of the CSCS Project on air quality health benefits can be explained by the small reduction in PM_{2.5} in the GreenSTEP model. One reason GreenSTEP is not showing a particularly large reduction in PM_{2.5} is because heavy-duty diesel vehicles are a larger driver of PM_{2.5} but are not under the purview of this project, which focuses on light-duty vehicles (LDV) only. A second reason for the modest decrease in PM_{2.5} is that GHG emissions reduction is a function of both decreased VMT per capita *and* technological and fuel changes. Reductions in PM_{2.5} from per capita VMT reduction are largely displaced with increasing population. Per capita VMT is decreasing, but VMT for the entire region will increase by 22.7% for Scenario A and 13.3% for Scenario B. Only Scenario C shows an overall reduction (2.2%) in regional VMT. The end result is that PM_{2.5} hardly changes at all.

There are additional limitations with using PM_{2.5} as the primary air quality pollutant in ITHIM. The model only accounts for long-term exposure to PM_{2.5} even though there is good evidence that short-term, episodic exposure to PM_{2.5} and other air pollutants results in health effects. ITHIM includes the effects of long-term exposure from PM_{2.5} such as heart disease related to air pollution, lung cancer mortality and respiratory diseases. ITHIM does not address short-term PM_{2.5} exposure including a one-day lag in hospitalizations and emergency department visits for ischemic heart disease and congestive heart failure (heart attacks) following a spike in PM_{2.5} concentrations. A region of 5 million people can expect one premature cardiovascular death from a heart attack for every 10 µg/m³ increase in PM_{2.5} during the preceding day [72]. Causal respiratory outcomes are less certain for short-term PM_{2.5} exposure but include emergency room visits and hospitalizations for COPD and respiratory infections [69].

Another limitation of ITHIM is that other important air pollutants highly attributable to LDV are not accounted for in the health model. The advisory group questioned the extent to which ITHIM was underestimating air quality benefits by limiting to PM_{2.5} and suggested expanding the pollutant profile to include other criteria pollutants such as ozone and air toxics such as benzene. Ground-source ozone (smog) is another air-pollutant highly associated with transportation-related air pollution and is strongly correlated with significant long-term and short-term respiratory health effects. Exposure to ozone can result in decreased resistance to respiratory and lung infections. Over time, this exposure may restrict lung growth in children, alter the airway and put significant stress on the cardiovascular system [70]. Analysis of longitudinal cohorts documents a likely causal effect on mortality and morbidity from long-term exposure to ozone. Mortality is estimated at about a 4% increase in risk for every 10 ppb exposure [73]. Ozone and other criteria pollutants could not be quantified in ITHIM due to high multicollinearity between transportation-related pollutants and high correlation of health outcomes.

Also excluded from ITHIM but with significant carcinogenic effects are air toxics. A recent analysis of these pollutants and resulting recommendations are available in the Portland Air Toxics Solutions (PATS) report [74, 75]. Air toxics related to carbon emissions standards may show larger decreases in ambient concentrations than PM_{2.5} in the scenarios. Although not included in ITHIM, decreased concentrations of air-toxics would also result in cancer and non-cancer health benefits. Recommendations from PATS include: use the ongoing regional transportation planning process to reduce vehicle use, target a 20% per person reduction in vehicle emissions by 2035, improve traffic signals to reduce congestion, support

strong national standards for clean vehicles, adopt the latest California clean car standards, and promote electric vehicle charging stations [74, 75].

PHD continues to use PM_{2.5} within ITHIM for several reasons. First, scientific understanding is well developed for PM_{2.5}, and it has the largest health impact at current ambient concentrations. (See appendix F for a broader discussion of PM_{2.5} science.) Second, the correlation between variables is high. Pollutants associated with LDV emissions show a great deal of multicollinearity. Health outcomes such as respiratory and cardiovascular disease resulting from exposure are also highly correlated. One recent and highly cited dual-pollutant model of ozone and PM_{2.5} showed ozone is primarily associated with respiratory outcomes and PM_{2.5} with cardiovascular outcomes [73]. This suggests current relative risks for PM_{2.5} may already account for some, but not all, of ozone respiratory effects and lung cancers from arsenic and chromium. Reductions in PM_{2.5} would be expected to have similar rates of reduction in death and disease [71, 72].

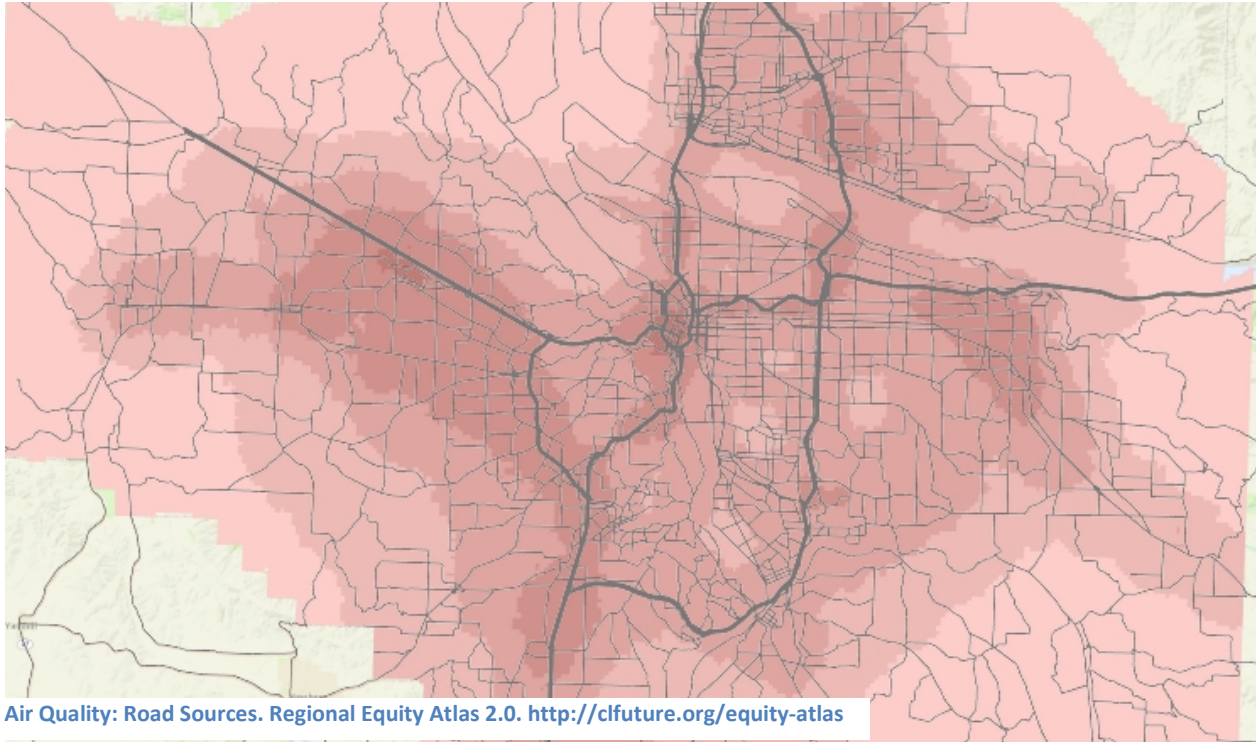
There is no level at which exposure to PM_{2.5} is safe.

The strategies and investments under consideration could protect health by reducing exposure to both PM_{2.5} and ozone.

It is important to note the temporal and localized effects of air pollution. ITHIM is based on long-term exposure, but short-term exposure to PM_{2.5}, ozone and other air pollutants is also associated with negative health effects. There is no level at which exposure to PM_{2.5} is safe [71, 72]. Any threshold for which ozone does not degrade health “is likely to lie below 0.045ppm” and may be lower than even 0.035ppm [71]. Climate change is also likely to result in warmer summers with even higher ground-source ozone levels.

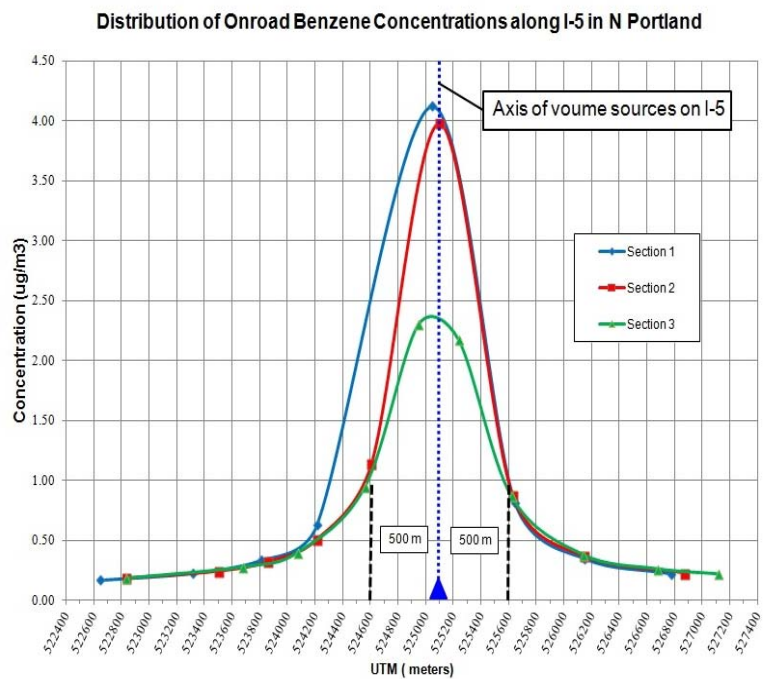
Additional analysis of temporal patterns (see Appendix F) shows that there were five episodes of elevated PM_{2.5} and one episode of elevated ozone in 2012. These spikes in short-term exposure are highly correlated and predictable from forecasted weather. Spikes in PM_{2.5} during winter inversion layers and ozone on hot, summer days call for short-term interventions. Regional transportation strategies could help address episodic, short-term exposure to both PM_{2.5} and ozone.

Air pollution is also highly localized[76]. Modest improvements in overall air quality should prompt modest gains in health benefits. These gains could be more significant in communities located near industry and transportation facilities due to the cumulative burden of exposure to air pollution from many sources [77, 78]. Models of air quality along road sources show higher concentrations of pollutants near interstates and on the windward side of the hills west of downtown Portland as seen in the map below.



A recent DEQ analysis of ambient benzene concentrations along Interstate 5 near Killingsworth Street in North Portland shows that in-road concentration levels are up to ten times higher than urban background levels. While the concentrations drop quickly, concentrations are still 3–4 times higher than urban background levels 500 meters (or 5 blocks) removed from the freeway.

Given the localized nature of air pollution, elevated exposure during transport, particularly in active modes, is a growing concern. The benefits of physical activity outweigh the risks of exposure to air pollutants [54-56, 79]. The literature shows mixed results when measuring concentrations by mode (car, bike, or walking) [80-84]. On major streets, everyone is exposed to much higher levels of air pollution no matter the activity. However, because pedestrians and cyclists have elevated respiratory rates and may be in the roadway



longer, individuals taking these modes have higher personal exposures and uptakes of pollutants [84, 85]. Similarly, individuals working or living along major roads and freeways will also be at risk for higher personal exposure [86].

Highlights of air quality

- Improved air quality is an important benefit of addressing GHG. Metro's scenarios result in modest PM_{2.5} reductions of 2.8, 3.2, and 3.6%. This translates into a relatively modest decrease in lung-cancer deaths, respiratory illness and heart disease related to long-term PM_{2.5} exposure.
- ITHIM underestimates health benefits associated with improved air quality by only incorporating long-term exposure to PM_{2.5}. Although likely that additional benefits would accrue from lower ambient ground-source ozone and air toxic concentrations, understanding the extent of such benefits is beyond the scope of this HIA.
- PHD recommends that Metro aligns the CSCS project investments and actions to PATS goals. Metro's scenarios address many of the PATS recommendations such as using technology to manage congestion, more efficient fuel standards and expanded use of electric vehicles. This should lead to a reduction in ambient air toxic concentrations and increased health. It is beyond this analysis to determine if the scenarios meet State of Oregon adopted ambient benchmark concentrations for the suite of pollutants monitored under PATS.
- There is no safe level of PM_{2.5} exposure and safe levels of exposure to ozone are much lower than current ground-source ozone averages. Short-term episodes of elevated PM_{2.5} (winter inversion layers) and ozone (hot, summer days) are not accounted for in ITHIM, but can result in elevated rates of cardiovascular and respiratory death and illness.
- Air quality is localized and many vulnerable populations live near transportation corridors. Transportation corridors are documented to have much higher ambient concentrations of pollutants than other areas. Care should be taken in designing active transportation facilities and buildings adjoining transportation corridors to balance supporting increased physical activity while minimizing exposure.

SUMMARY OF KEY FINDINGS

GHG emission reductions using the proposed strategies will improve health through reducing the risk of climate change and through important health benefits associated physical activity, traffic safety, and improved air quality. Current levels of investment (Scenario A) are expected to contribute to 64 avoided deaths annually; Scenarios B and C would result in 98 and 133 avoided deaths respectively. Every 12 percent decrease in GHG emission – the difference between Metro scenarios - would result in approximately a 0.65 percent decrease in DALYS (illness) among diseases studied.

The majority of health benefits (87-91 percent of avoided deaths, 79-88 percent of avoided illness) from proposed strategies, regardless of scenario, are attributable to increased physical activity from active transportation such as walking and biking to work, transit, school, and other destinations. A transportation system with a broad range of safe and convenient options provides individuals with flexible and healthy choices needed to routinely shift from single occupancy vehicles to more active modes of transportation.

RECOMMENDATIONS

Climate change poses a risk to the future health of Oregonians. Proposed strategies to mitigate climate change will also increase health benefits associated with physical activity, traffic safety and improved air quality. Based upon the findings of this report and with the support of the CCC HIA Advisory Committee, PHD has developed a series of recommendations to preserve and promote healthy communities throughout the region.

By developing and implementing a preferred scenario that meets or surpasses the GHG emissions reduction target set by the Department of Land Conservation and Development, PHD anticipates an improvement in public health.

The majority of health benefits from the CSCS Project can be attributed to active transportation such as walking and biking to work, transit, school and community destinations. **Based on this evidence, PHD recommends that Metro maximize opportunities for active transportation for all communities by:**

- Adopting and identifying stable funding for the design elements listed in the subsection ‘Complete Streets and Active Transportation’ of Scenarios B and C: street connections, wider sidewalks, safer street crossings, improved bus stops, bikeways, transit signal priority, and on-street bicycle facilities and trails.
- Improving transit service miles to meet levels recommended in Scenario C.
- Using an equity analysis to plan and develop equal access to active transportation throughout the region.

While the benefits of physical activity far outweigh the risks, active modes of transportation can lead to increased exposure to traffic injury and air pollution. **In order to reduce the risk of increased exposure**

to traffic injury and air pollution for all road users, PHD recommends that Metro prioritize the design and maintenance of non-automobile facilities by:

- Including safety features for pedestrians and bicyclists such as separation from motorized traffic when possible. Prioritize non-automobile users in design and maintenance of streets.
- Providing a parallel bicycle route one block removed from high-volume roads when feasible to reduce exposure to localized pollution while still maintaining access to community destinations.

Per capita VMT reduction is expected to modestly improve air quality as measured by many pollutants including air toxics, but temporal and localized air quality concerns remain. **Due to temporal and spatial air quality concerns, PHD recommends that Metro maximize overall improvements in air quality through actions such as:**

- Aligning the CSCS preferred alternative to PATS goals. In collaboration with DEQ, determine how the preferred alternative helps meet State of Oregon adopted ambient benchmark concentrations.
- Reducing exposure by using zoning and incentives to improve indoor filtration systems in new buildings along transportation corridors.
- Convening a regional committee to further address episodic air quality events. Solutions should be season specific and could promote incentives for short-term, alternative commute arrangements.

Finally, to improve health equity, PHD recommends Metro ensure social and health goals are considered when prioritizing investments by:

- Explicitly and transparently addressing how investment links low-income and other vulnerable households to health-promoting resources.

APPENDICES

- A. HIA Minimum Elements and Practice Standards
- B. Advisory committee
- C. Health conditions and prevalence rates by county (BRFSS)
- D. CDC Chronic Disease Cost Calculator
- E. ITHIM results
- F. Air quality white paper

Appendix A. HIA Minimum Elements and Practice Standards

November 2010, Version 2

North American HIA Practice Standards Working Group, Society for the Practitioners of HIA

A health impact assessment (HIA) must include the following minimum elements, which together distinguish HIA from other processes. An HIA:

1. Is initiated to inform a decision-making process, and conducted in advance of a policy, plan, program, or project decision;
2. Utilizes a systematic analytic process with the following characteristics:
 - a. Includes a scoping phase that comprehensively considers potential impacts on health outcomes as well as on social, environmental, and economic health determinants, and selects potentially significant issues for impact analysis;
 - b. Solicits and utilizes input from stakeholders;
 - c. Establishes baseline conditions for health, describing health outcomes, health determinants, affected populations, and vulnerable sub-populations;
 - d. Uses the best available evidence to judge the magnitude, likelihood, distribution, and permanence of potential impacts on human health or health determinants;
 - e. Rests conclusions and recommendations on a transparent and context-specific synthesis of evidence, acknowledging sources of data, methodological assumptions, strengths and limitations of evidence and uncertainties;
3. Identifies appropriate recommendations, mitigations and/or design alternatives to protect and promote health;
4. Proposes a monitoring plan for tracking the decision's implementation on health impacts/determinants of concern;
5. Includes transparent, publicly accessible documentation of the process, methods, findings, sponsors, funding sources, participants and their respective roles.

Appendix B. List of CCC HIA Advisory Committee members

Tom Armstrong
City of Portland

Sarah Armitage
DEQ

Adam Barber
Multnomah County Planning

Aida Biberic
DEQ

Janne Boone-Heinonen
OHSU

Margi Bradway
ODOT

Peter Brandom
City of Hillsboro

Ben Bryant
City of Tualatin

Karen Buehrig
Clackamas County

Steve Butler
City of Milwaukie

Betsy Clapp
Multnomah County Health Dept.

Lynda David
Regional Transportation Council

Chris Deffebach
Washington County

Jennifer Donnelly
Dept. of Land Conservation & Development

Denny Egner
Dept. of Land Conservation & Development

Kim Ellis
Metro, Principal Transportation Planner

Leah Fisher
Health Promotion & Chronic Disease Prevention

Barbara Fryer
City of Beaverton

Jana Gastellum
Oregon Environmental council

Andy Ginsburg
DEQ

Heather Gramp
PHD

Mara Gross
Coalition for Livable Future

Tia Henderson
Upstream Public Health

Eric Hesse
TriMet

Jon Holan
City of Forest Grove

Stacy Humphrey
City of Gresham, Urban Design & Planning
Dept.

Katherine Kelley
City of Gresham

Mary Kyle McCurdy
1000 Friends of Oregon

Nancy Kraushaar
City of Wilsonville

Michelle Kunec
City of Portland

John MacArthur
Oregon Transportation Research and
Education Consortium-PSU

Margaret Middleton
City of Beaverton

Thaya Patton
Metro

Barbara Pizacani
PDES

Mel Rader
Upstream Public Health

Dan Rutzick
City of Hillsboro

Vivek Shandas
PSU

Lainie Smith
ODOT

Steve White
Oregon Public Health Institute

Appendix C. County-level BRFSS

BRFSS 2011 category	U.S. state median	Percent of adults [95% confidence interval]				
		Oregon	Portland MSA ²	Clackamas ¹	Multnomah ¹	Washington ¹
Heart attack	4.4	3.6 [3.1–4.2]	3.2 [2.5–4.0]	3.3 [1.7–5.0]	3.0 [1.5–4.5]	2.6 [1.5–3.8]
Chest pain or coronary heart disease	4.1	3.6 [3.1–4.0]	3.1 [2.4–3.7]	2.8 [1.4–4.2]	2.9 [1.7–4.2]	2.9 [1.6–4.2]
Stroke	2.9	2.9 [2.5–3.4]	2.7 [2.1–3.3]	2.8 [1.2–4.4]	2.7 [1.4–3.9]	3.0 [1.5–4.5]
Any physical activity last month?	73.8	80.3 [78.7–81.3]	81.5 [79.5–83.6]			
150 minutes of Aerobic per week	57.7	61.1 [59.3–62.9]	60.3 [57.8–62.8]	62.5 [56.7–68.2]	65.0 [60.9–69.2]	58.4 [53.0–63.8]
High blood pressure	30.8	29.9 [28.5–31.3]	27.9 [26.0–29.9]	30.6 [25.8–35.4]	26.8 [23.5–30.2]	27.1 [23.0–31.2]
Cholesterol checked and high in past 5 years	38.4	38.5 [36.8–40.2]	36.1 [33.8–38.5]	39.3 [33.5–45.1]	37.0 [32.8–41.2]	33.5 [28.7–38.3]
Overweight	35.7	34.8 [33.31–36.4]	35.8 [33.4–38.1]	35.6 [30.0–41.1]	35.9 [32.0–39.8]	34.3 [29.4–39.2]
Obese	27.8	26.7 [25.2–28.3]	23.7 [21.7–25.7]	25.4 [20.3–30.6]	19.5 [16.3–22.6]	25.5 [21.0–30.0]
Diabetic	9.5	9.3 [8.4–10.2]	8.5 [7.3–9.8]	8.6 [5.7–11.5]	8.8 [6.7–10.9]	6.0 [4.2–7.8]
Depression (ever treated)	17.5	23.9 [27.5–25.3]	22.8 [20.8–24.7]	21.7 [17.2–26.1]	25.5 [21.9–29.1]	22.3 [18.2–26.3]
COPD (Chronic obstructive pulmonary disease)	6.1	5.9 [5.2–6.7]	5.2 [4.2–6.3]	5.2 [3.1–7.3]	5.1 [2.9–7.4]	5.2 [3.2–7.2]
Ever had asthma	13.6	16.7 [15.4–18.0]	16.2 [14.3–18.0]	13.9 [10.2–17.5]	15.4 [12.3–18.5]	20.8 [16.1–25.6]
Current asthma	9.1	10.5 [9.4–11.5]	9.6 [8.2–11.0]	8.3 [5.5–11.0]	9.0 [6.5–11.4]	10.9 [7.7–14.2]

(1) These are not age-adjusted prevalence rates; caution should be used when comparing counties.

(2) The Portland-Vancouver-Hillsboro OR-WA MSA is defined as the seven-county region including Clackamas, Columbia, Multnomah, Washington and Yamhill Counties in Oregon, and Clark and Skamania Counties in Washington

Appendix D. CDC Chronic Disease Cost Calculator

The costs of chronic disease reported are from a recent version (November 2013) of the CDC's Chronic Disease Cost Calculator that can be found at www.cdc.gov/chronicdisease/resources/calculator/index.htm. The Cost Calculator uses a regression-based approach to estimate costs for chronic disease by state and payer type for the treated population. Below is a table of the Oregon (not three-county) results with accompanying notes as provided by the calculator, descriptions of datasets from the technical guide found at www.cdc.gov/chronicdisease/pdf/cdcc_tech_appendix.pdf, and the FAQs found at www.cdc.gov/chronicdisease/resources/calculator/faq.htm.

Overall summary for all diseases for Oregon

	All payers	Medicaid	Medicare	Private insurers	Absenteeism	All payers+ absenteeism
Arthritis	\$1,553	\$69	\$445	\$610		
Asthma	\$411	\$79	\$92	\$153		
Cancer	\$1,888	\$43	\$620	\$878	\$202	\$1,754
Congestive heart failure	\$182	\$27	\$72	\$23	\$40	\$451
Coronary heart disease	\$1,098	\$29	\$390	\$442	\$106	\$1,994
Hypertension	\$1,382	\$109	\$349	\$460	\$3	\$185
Stroke	\$832	\$112	\$281	\$147	\$45	\$1,143
Other heart disease	\$603	\$69	\$248	\$158	\$63	\$1,445
Depression	\$892	\$51	\$187	\$367	\$53	\$885
Diabetes	\$1,658	\$137	\$464	\$528	\$9	\$612
Diseases of the Heart	\$1,883	\$125	\$710	\$624	\$94	\$986
Total cardiovascular disease	\$3,620	\$281	\$1,174	\$1,123	\$62	\$1,721

*Costs reported in millions.

*Includes costs only for diseases that are selected and have cost values available.

Notes:

Annual expenditures inflated to 2010 \$ following recommendations from the Agency for Healthcare Research and Quality. Costs include expenditures for office based visits, hospital outpatient visits, emergency room visits, inpatient hospital stays, dental visits, home health care, vision aids, other medical supplies and equipment, prescription medicines, and nursing homes. Payer populations are not mutually exclusive. Costs for all payers are calculated independently of costs for Medicaid, Medicare, and private insurers. Sums of the total costs across subpopulations may not equal the overall total costs due to rounding. Treated population is defined as the number of people receiving care for the disease in the previous year. The treated population in the Medical Expenditure Panel Survey and the National Nursing Home Survey was likely more resource-intensive than those included in alternative prevalence definitions based on a history of the disease who have not sought treatment recently. All results generated from the tool are estimates. Actual costs may be larger or smaller than those reported. [Continued below.]

The estimates for hypertension and diabetes include a portion of the costs of complications including congestive heart failure (CHF), coronary heart disease (CHD), stroke and other heart diseases. The sum of costs over selected diseases that include hypertension and diabetes could overestimate the costs associated with all the selected diseases. The costs for diseases of the heart include CHD, CHF, and other heart disease. The costs for total cardiovascular disease include diseases of the heart, stroke, and an estimate of hypertension costs that avoids double-counting of costs with other diseases. Excluding the costs of complications lowers the estimates for hypertension and diabetes by approximately 34% and 39%, respectively.

CDC Cost Calculator, default source data sets,

- (See: http://www.cdc.gov/chronicdisease/pdf/cdcc_tech_appendix.pdf for more information) *U.S. Census Bureau*: Total state population and breakdowns by sex and age for 2008 and state population projections by sex and age for 2010 through 2020 came from the U.S. Census Bureau.
- *Kaiser Family Foundation*: Medicare beneficiary data came from the Kaiser Family Foundation 2008 Medicare Health and Prescription Drug Plan Tracker.
- *Medicaid Statistical Information System (MSIS)*: Medicaid enrollment data came from the Medicaid Statistical Information System (MSIS) State Summary Fiscal Year 2008. MSIS data are used by CMS to produce Medicaid program characteristics and utilization information for the states. The purpose of MSIS is to collect, manage, analyze and disseminate information on eligibles, beneficiaries, utilization and payment for services covered by State Medicaid programs.
- *Current Population Survey (CPS)*: Private insurance enrollment data and breakdowns of enrollment by sex and age by payer (private insurance, Medicaid, and Medicare) came from the Current Population Survey (CPS). Private insurance data came from the 2008 CPS and Medicaid and Medicare data came from the 2007 through 2009 CPS. The Current Population Survey (CPS) is a monthly survey of about 50,000 households conducted by the Bureau of the Census for the Bureau of Labor Statistics. The sample is scientifically selected to represent the civilian noninstitutional population. The sample provides estimates for the nation as a whole and serves as part of model-based estimates for individual states and other geographic areas.

Treated Population, per-person costs, and absenteeism (*Treated population is defined as the number of people receiving care for the disease in the previous year.*)

- *Medical Expenditure Panel Survey (MEPS)* Data were pooled from the 2004 through 2008 Medical Expenditure Panel Survey (MEPS) Consolidated Data Files, a nationally representative survey of the civilian non-institutionalized population that provides data on annual medical expenditures, sources of payment, insurance coverage, and days missed from work due to illness or injury for each participant. The combined five-year MEPS sample included 153,012 persons of all ages living in the U.S. Estimates for both the treated population and costs have been adjusted to be nationally representative using MEPS sampling weights for years 2004 through 2008. The default data include years prior to the implementation of Medicare Part D, which took effect in 2006. All expenditure data were inflated to 2010 dollars using the gross domestic product general price index as recommended by Agency for Healthcare Research and Quality to reflect more current dollar values.

- *National Nursing Home Survey (NNHS)* Estimates for the institutionalized population, which are not available in other data sources, were derived from the 2004 National Nursing Home Survey (NNHS). The NNHS is a nationally representative sample of United States nursing homes, their services, their staff, and their residents. The NNHS provides information on nursing homes from two perspectives-that of the provider of services and that of the recipient of care. For recipients, data were obtained on demographic characteristics, health status, and sources of payment. Diseases were defined using International Classification of Disease (ICD-9) codes based on any diagnosis of the condition, either at admission or time of the survey and primary or secondary diagnosis.

Appendix E. ITHIM methodology and detailed results

The Integrated Transport and Health Impact Model (ITHIM) was developed by public health researchers in the United Kingdom to assess the potential health impacts of GHG emission reduction scenarios for London, U.K. and Delhi, India [4]. The model was later adapted for use in the San Francisco Bay area and applied to transportation scenarios created to comply with California's GHG emissions reduction goals. PHD further adapted the tool for use in the Portland metropolitan region for the CSCS HIA by using census data for the geography that makes up the Portland metropolitan region. In the CSCS HIA, PHD used ITHIM to assess six sample scenarios representative of a range of options associated with the 144 Phase 1 scenarios Metro was currently investigating. One of the recommendations of the CSCS HIA was to rerun ITHIM when the alternative scenarios had been narrowed by Metro to a manageable number. The CCC HIA contains the ITHIM analysis of the three scenarios (A, B, and C) defined in Metro's Phase 2 of the CSCS Project.

METHODOLOGY

For each disease considered, ITHIM applies measures of changes in exposure to estimate changes in mortality (deaths) and illness (as measured by disability adjusted life years or DALYs). ITHIM calculates mortality and illness for both baseline and each scenario and outputs are generally reported in the difference between baseline and scenario. Conceptually, baseline in ITHIM is the expected number of deaths and illness given the current rate of exposure for the expected population in 2035. Estimated impact is the difference between the expected outcome at baseline and the scenario.

ITHIM's methodology is grounded in applying relative risks to appropriate demographics. Relative risk is a statistical construct used by epidemiologists to understand the ratio of the probability of an event (developing a disease or dying) for those exposed compared to the probability of developing the disease without the exposure. In practice, relative risks are developed from large, longitudinal studies. For example, the probability of developing diabetes between two different groups — those who met the Surgeon General's exercise recommendations and those who did not — can be calculated from national, longitudinal survey data. Applying relative risks calculated from large cohort studies or in some cases, meta-analyses of multiple studies, allows ITHIM to estimate the number of new deaths or incidence of disease given current prevalence (or burden of disease) rates and the expected change in exposure from each scenario. By doing so, ITHIM is able to quantify the difference between baseline and scenario and allows for comparisons across scenarios.

One advantage of ITHIM is the ability to compare across various pathways. This is especially true when the tool can be refined to include local data. ITHIM was initially developed using global burden of disease data. This was updated with U.S. prevalence data for the San Francisco and CSCS HIA work. For the CCC HIA, PHD further refined ITHIM by using Oregon-specific prevalence

data for mortalities; local demographic data was used to extrapolate WHO models to local populations for DALYs.

This burden of disease approach allows for a comparison in impacts from each disease included and, by summing diseases by exposure type, from exposure pathways. For instance, it allows PHD to state that Scenario B will prevent six times as many stroke deaths (through increased exercise) as traffic fatalities.

ITHIM uses the relative risks for 13 separate diseases assigned to three exposure pathways: physical activity, traffic safety, and particulate air pollution as indicated by PM_{2.5}. The burden of disease approach is helpful in understanding which exposure pathway and/or disease is driving health benefits (or burdens). In turn, this allows specific recommendations and mitigation measures to maximize health given the constraints of the scenarios.

ITHIM depends on modeled and survey data such as burden of disease estimates, relative risk ratios, air pollution estimates and outputs from ODOT’s GreenSTEP model. ITHIM does not account for statistical uncertainty of modeled and survey data, which likely increases the uncertainty of ITHIM estimates.

The primary limitation of ITHIM is that it underestimates health benefits due to data availability and the specific exposures and diseases represented in each pathway. Although such an assessment is outside of the scope of this HIA, additional analyses on the reduction of toxic air pollutants and ozone from transportation and transportation-specific policies (such as fleet turnover and advances in fuel technology) would likely show additional health benefits.

Table E-1 Exposure pathway, variable, and included illness for ITHIM

	Exposure pathway		
	Physical activity	Traffic safety	Air quality
Exposure variable	Per capita miles traveled by mode as modeled by GreenSTEP	Miles traveled by person by mode by type of street (non-arterial, arterial, freeway) as modeled by GreenSTEP	PM _{2.5} as modeled by GreenSTEP
Included illness	<ul style="list-style-type: none"> • Breast cancer • Colon cancer • Stroke² • Ischemic heart disease² • Depression³ • Dementia • Diabetes • Hypertensive heart disease² 	Serious traffic injuries	<ul style="list-style-type: none"> • Lung cancer¹ • Inflammatory heart disease^{1,3} • Respiratory disease¹

(1) Illness is measured by disability adjusted life years (DALYs) which is the summation of Years of Life Lost (YLL) and Years of Life with Disability (YLD). These illnesses do not have YLD rates available.

(2) While primarily affected by changes in exposure to physical activity, ITHIM also applies an air quality factor to these illnesses.

(3) Relative risks of death were not available for these illnesses.

ITHIM is limited in its ability to quantify and compare health pathways by the specific diseases included in each pathway. Inclusion of disease is based upon the availability of data for the relative risk, the relative importance of the disease for that particular exposure, and the ability to control the relative risk for other diseases of interest. Table E-1 lists the specific diseases by exposure category in this version of ITHIM. Because ITHIM is limited to the 13 diseases, it likely underestimates the health benefits from reducing GHG emissions in all of the major exposure routes. Contemporary trends in medical science are increasingly linking physical activity to many other diseases, conditions, and cancers. Similarly, traffic safety in ITHIM is limited to prevalence rates of *reported* collisions; ITHIM thus underestimates the number of prevented collisions to the extent that collisions are under-reported – particularly for bicyclists. Air quality is limited in ITHIM to PM_{2.5} exposure only and thus underestimates health benefits from lower concentrations of a variety of ambient pollutants including ozone and air toxics.

Air quality affects a broad range of health outcomes and can be described through dozens of exposure variables. Advisory committee members suggested that ITHIM's treatment of the air pollution pathway was particularly weak due to its reliance on PM_{2.5} as the *only* exposure variable for light-duty vehicle (LDV) emissions. PHD feels confident in PM_{2.5} as the indicator due to the state of the science surrounding PM_{2.5} as transportation-related air pollutant. However, PHD acknowledges that PM_{2.5} does not capture the entire LDV emission profile including those of ozone precursors and air toxics. (Please see Appendix F for further discussion.) It is also important to note that PM_{2.5} is considered a good transportation indicator because of the vast amount attributable to heavy-duty diesel emissions; however diesel emissions are beyond the scope of Metro's planning project.

PHD investigated adding additional pollutant profiles into ITHIM but ran into several issues. First, there is a high occurrence of multicollinearity between transportation-related emission pollutants and correlation between health outcomes. For example, in most of the country, long-term ozone and PM_{2.5} measurements are highly correlated. Relative risks constructed with multi-pollutant models are relatively rare. Thus, even though PM_{2.5} appears biologically linked to cardiovascular disease and ozone to respiratory disease, either pollutant can be used to predict both diseases. Summing PM_{2.5} and ozone impacts would certainly double-count to some degree. This also suggests that some of the PM_{2.5} health effects captured in the relative risks for lung cancer, respiratory disease, and cardiovascular disease may be picking up effects from other transportation related pollutants that are highly correlated with PM_{2.5} emissions. For example, reduced time to death for lung cancer patients from PM_{2.5} exposure may also include some lung cancers deaths from benzene exposure given the current science supporting the relative risk estimates. Complicating matters further, the cardiovascular and respiratory systems are biologically linked, making any separation of health outcomes difficult, particularly across a suite of pollutants.

Second, knowledge about the health risks of many air pollutants is based on toxicology studies for cancer. For example, most air toxics tracked by Oregon DEQ are known carcinogens.

However, the risk of air toxics is generally stated in the *lifetime* risk of disease based on at least a multi-year exposure, such as working for many years at an industrial plant with high levels of toxic exposure. *Relative* risk ratios have an interpretation of yearly incidence or prevalence of disease based upon a shorter-term exposure such as a year; and is difficult to convert *lifetime* risk.

DETAILED RESULTS

Table E-2 provides detailed ITHIM results by exposure pathway for all three scenarios. Results include avoided mortality (deaths) and illness. Illness is measured by disability adjusted life years (DALY) which is the summation of years of life lost (YLL) and years living with a disability (YLD) due to illness. Results are presented in counts (or cases) avoided as well as percent reduction from current disease prevalence levels. Also note that ITHIM's raw count output assumes a stable (in this case 2010) population. All results in the report have been adjusted approximately 32% upward to account for population growth within the UGB. For example, there should be 58 fewer deaths from increased physical activity in 2035 if Scenario A is implemented. This is 1.4% decrease in current deaths attributable to physical inactivity.

Table E-2 Avoided mortality and illness (DALY) by exposure pathway and scenario

	Avoided	Scenario A			Scenario B			Scenario C		
		Count	Percent	Count w/ population factor ¹	Count	Percent	Count w/ population factor ¹	Count	Percent	Count w/ population factor ¹
Physical activity	Mortality	-44	-1.4%	-58	-68	-2.1%	-89	-88	-2.9%	-116
	YLL	-355	-1.5%	-468	-566	-2.3%	-747	-748	-3.1%	-988
	YLD	-247	-1.0%	-325	-444	-1.6%	-586	-605	-2.3%	-799
	DALY	-601	-1.3%	-793	-1,010	-1.9%	-1333	-1,354	-2.8%	-1786
Traffic safety	Mortality	-1	-1.2%	-1	-3	-3.5%	-4	-9	-10.5%	-12
	YLL	-21	-1.2%	-28	-64	-3.5%	-84	-190	-10.5%	-251
	YLD	-33	-3.8%	-44	-68	-7.6%	-89	-145	-16.4%	-192
	DALY	-55	-2.0%	-72	-131	-4.9%	-173	-336	-12.5%	-443
Air quality (PM_{2.5})	Mortality	-3	-0.2%	-4	-4	0.2%	-5	-4	-0.3%	-5
	YLL	-28	-0.2%	-37	-32	0.2%	-42	-36	-0.3%	-47
	YLD	-0	-0.0%	0	-0	0.0%	0	-0	-0.0%	0
	DALY	-28	-0.2%	-37	-32	0.2%	-42	-36	-0.2%	-47
Total	Mortality	-48	-0.9%	-64	-74	1.4%	-98	-101	-2.0%	-133
	YLL	-404	-0.9%	-533	-662	1.4%	-874	-974	-2.1%	-1286
	YLD	-280	-0.6%	-370	-511	1.1%	-675	-750	-1.6%	-990
	DALY	-684	-0.7%	-903	-1,173	1.3%	-1548	-1,725	-1.9%	-2276

(1) ITHIM estimates disease reduction based on stable (2010) population figures. Assuming disease burden rates remain the same in 2035, counts are adjusted upward by addressing the 32.0% increase in population expected within the Urban Growth Boundary from 2010 to 2035.

(2) Disability adjusted life years (DALY) is the summation of years of life lost (YLL) and years living with a disability (YLD) due to illness. YLD are unavailable for respiratory and inflammatory cardiovascular disease (all cardiovascular disease associated with air pollution exposure) as well as lung cancer at this time.

To compare exposure pathways, the percent reduction attributable to each was calculated for deaths and illnesses. Table E-3 provides detailed results and shows that the majority of health benefits are from reducing physical inactivity burden.

Table E-3 Percent of health benefits attributable to exposure pathway by scenario

		Percent reduction attributable to exposure pathway		
		A	B	C
Physical activity	Mortality	91.4%	91.1%	87.0%
	YLL	87.8%	85.6%	76.8%
	YLD	88.0%	86.8%	80.6%
	DALY	87.9%	86.1%	78.5%
Traffic safety	Mortality	2.1%	4.1%	9.1%
	YLL	5.3%	9.6%	19.5%
	YLD	11.9%	13.2%	19.4%
	DALY	8.0%	11.2%	19.5%
Air quality	Mortality	6.5%	4.8%	3.9%
	YLL	7.0%	4.8%	3.7%
	YLD	0.0%	0.0%	0.0%
	DALY	4.1%	2.7%	2.1%

THIM provides outputs by disease for exposure pathways in which more than one disease is included. Tables E-4 present the population adjusted avoided illness (DALY) and mortality results for individual diseases in the physical activity and air quality (PM_{2.5}) exposure pathways.

Table E-4 Avoided mortality and illness (DALY) by illness and scenario for physical activity and air quality exposure pathways¹

	Scenario A		Scenario B		Scenario C	
	DALY	Mortality	DALY	Mortality	DALY	Mortality
Breast cancer	-13	-1	-29	-1	-32	-1
Colon cancer	-11	-1	-21	-2	-24	-2
Stroke	-181	-15	-290	-23	-400	-29
Ischemic heart disease	-205	-20	-319	-30	-442	-42
Depression	-57		-125		-162	
Dementia	-117	-8	-220	-14	-241	-15
Diabetes	-129	-5	-209	-7	-324	-10
Hypertensive heart disease	-79	-9	-119	-12	-161	-16
Physical activity total	-793	-58	-1,333	-89	-1,786	-116
Lung cancer	-21	-2	-24	-2	-26	-3
Inflammatory heart disease (associated with PM2.5 exposure)	-2		-3		-3	
Respiratory disease	-14	-2	-16	-2	-17	-2
Air quality (PM_{2.5}) Total	-37	-4	-42	-5	-47	-5

(1) ITHIM estimates disease reduction based on stable (2010) population figures. Assuming disease burden rates remain the same in 2035, counts are adjusted upward by addressing the 32.0% increase in population expected within the Urban Growth Boundary from 2010 to 2035.

ITHIM addresses traffic safety by estimating the number of severe crashes and fatalities by mode and by type of road. The tool is able to account for increased crashes for active transportation users even as overall traffic crashes decrease as miles travel shift from car to other modes. Table E-5 and E-6 present estimates for traffic fatalities and injuries respectively in 2035. Note that all counts have been adjusted for 2035 population. Also note that injuries are serious injurious only. Injury information is further analyzed to develop DALY results presented above.

Table E-5 ITHIM estimates of expected DALYs from traffic injuries by mode in 2035

Mode	Baseline	Scenario A	Scenario B	Scenario C
Walk	889.2	958.3	952.8	898.1
Cycle	316.7	312.3	356.7	372.7
Bus	0.0	0.0	0.0	0.0
Car	1905.8	1773.9	1639.5	1418.1
Motorbike	424.5	419.4	413.9	404.4
Total ¹	3555.4	3483.0	3382.0	3112.5
Sum of difference between baseline and scenario		-72.4	-173.3	-442.9

(1) Note that the total is not the sum of the modes presented as it also adds in a small but fixed number of HGV crashes.

Table E-6 ITHIM Estimates of Expected Traffic Fatalities by Mode in 2035

Mode	Baseline	Scenario A	Scenario B	Scenario C
Walk	34.3	37.0	36.7	34.6
Cycle	10.4	10.2	11.7	12.4
Bus	0.0	0.0	0.0	0.0
Car	53.4	49.7	45.9	39.7
Motorbike	15.9	15.8	15.6	15.3
Total ¹	114.8	113.4	110.7	102.7
Sum of Difference between Baseline and Scenario		-1.4	-4.0	-12.1

(1) Note that the total is not the sum of the modes presented as it also adds in a small but fixed number of HGV crashes

Appendix F. Air Quality White Paper

ITHIM estimates air pollution mortality and morbidity using particulate matter (PM_{2.5}) as an indicator. The advisory group suggested exploring the expansion of the pollutant profile and expected health impacts beyond PM_{2.5}. Other commonly considered air pollutants include ground-level ozone (O₃) and NO₂ exposure. Ambient air is also monitored for known carcinogens or air toxics. All of these pollutants were investigated for potential inclusion in this HIA.

Air pollution is primarily regulated through the U.S. EPA and monitored by Oregon. The most prominent EPA regulations are for six ‘criteria’ pollutants. Three of these are particularly relevant to transportation: PM_{2.5}, ozone and NO₂. The regulator context informs both the current conditions and the body of scientific evidence. Table 1 provides a summary of the most recent EPA science reviews for PM_{2.5}, ozone and NO₂ and includes known health outcomes and the relative weight of evidence. The health outcomes are cardiovascular (PM_{2.5}), respiratory (ozone) and central nervous system illness, and death. Because PM and ozone are further developed, the remainder of this section concentrates on these two pollutants when discussing criteria pollutants.

TABLE 1 Summary of U.S. EPA integrated science assessment weight of evidence for health effects associated with PM, ozone, and NO₂

Health outcome	PM (PM _{2.5}) 2009 ISA[69]	O ₃ 2013 ISA[70]	NO _x (NO ₂) 2008 ISA[68]
Short term exposure			
Respiratory morbidity	●●●●	●●●●●	●●●●
Cardiovascular morbidity	●●●●●	●●●●	●●
Central nervous system morbidity	Not reviewed	●●●	Not reviewed
Mortality	●●●●●	●●●●	●●●
Long term exposure			
Respiratory morbidity	●●●●	●●●●	●●●
Cardiovascular morbidity	●●●●●	●●●	●●
Reproductive/birth outcomes	●●●	●●●	●●
Central nervous system morbidity	Not reviewed	●●●	Not reviewed
Cancer	●●●	●●	●●
Mortality	●●●●●	●●●	●●

- **Causal** - Evidence is sufficient to conclude there is a causal relationship and has been shown to result in health effects in studies in which chance, bias, and confounding could be ruled out with reasonable confidence.
- **Causal likely** - Evidence is sufficient to conclude that a causal relationship is likely to exist, but important uncertainties remain.
- **Suggestive of causal** - Evidence is suggestive of a causal relationship but is limited. (i.e. - relies only on toxicology, or high quality epidemiological study is inconsistent with past evidence)
- **Inadequate to Infer** - Evidence is inadequate to determine that a causal relationship exists; available studies are of insufficient quantity, quality, consistency, or statistical power.
- **Not likely to be causal**

Scientific consensus about the strength of and causal nature of the relationships between PM_{2.5} and health is clear from the EPA reviews [68-70]. A recent World Health Organization scientific review also concludes that PM_{2.5} is the best air pollution indicator for health impact analyses [71]. Because the

health pathways and risk ratios are most developed for PM_{2.5}, PHD feels confident in using PM_{2.5} as the primary air pollution indicator within ITHIM.

Still, health evidence is mounting for ambient exposure from ozone and certain air toxics. Further, some pollutants affect certain health outcomes more than others. The following sub-sections provide analyses of criteria pollutants (PM_{2.5} and ozone) and carcinogenic air toxics. Each section provides a brief literature review to understand the breadth and severity of health effects followed by presentation of local incidence of disease and pollution conditions. After the discussion of specific pollutants is a section that addresses the spatial distribution of air pollution and the health burden it places on specific vulnerable populations.

Criteria pollutants (PM_{2.5} and ozone)

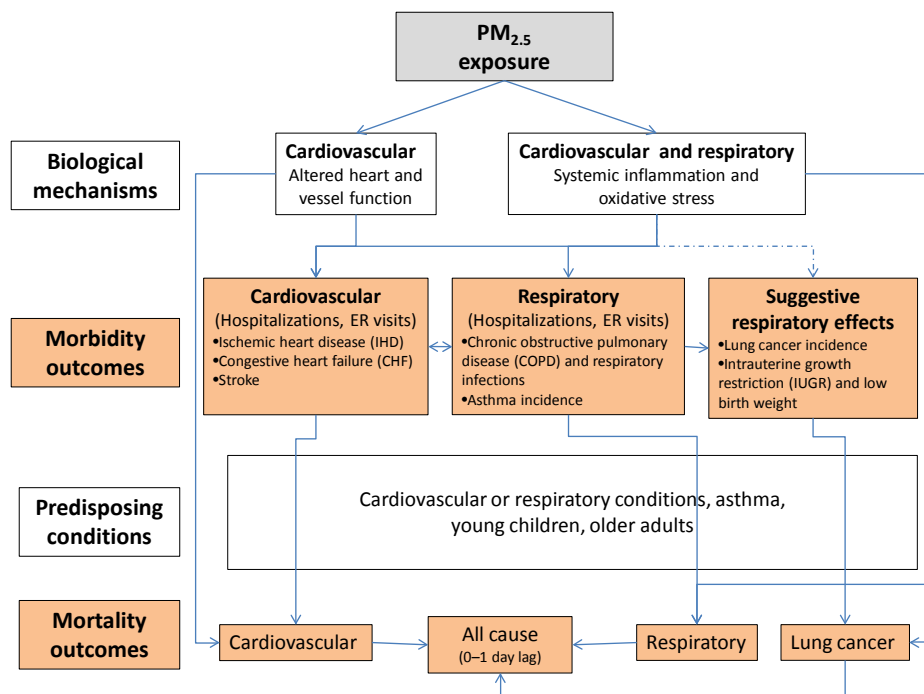
EPA regulates six criteria pollutants including PM_{2.5} and ozone. PM_{2.5} is ambient ultra-fine particles created during the combustion process and is primarily an issue during winter inversion layers. Ozone is created from reactions of precursor pollutants — largely emitted through combustion processes — in the presence of solar radiation. Elevated ground-source ozone concentrations typically occur in the afternoon and during summer months. The primary route of exposure for PM_{2.5} and ozone is through inhalation.

Transportation emissions are a significant source of both pollutants. Nationally, road transportation accounts for 6.9% of PM_{2.5} emission totals. Ozone is routinely reported in terms of precursor pollutants with 38.5% of NO_x and 1.2% of SO_x emission totals attributable to road transportation. Populations clustered near roads are much more likely to be exposed to road transportation sources. A recent study estimated that weighting concentrations by population would result in road transportation as the top contributor of human exposure. In this model, road transportation accounted for 26.3% of PM_{2.5} and 54.3% of ozone exposure [87].

Health pathways for PM_{2.5}

Inhaling PM_{2.5} harms the heart and lungs as the particles embed deep within the respiratory tract. Particulate matter degrades health through systemic inflammation, oxidative stress, and altered heart and blood vessel function. Short and long-term health outcomes of concern are primarily cardiovascular with secondary respiratory effects (see Figure E.1).

FIGURE E.1 Pathway diagram- Particulate matter exposure and health outcomes



The EPA states with the highest levels of confidence that short and long-term exposure to PM_{2.5} causes cardiovascular morbidity (illness) and mortality (death), likely causes respiratory disease and death, is increasingly associated with poor birth outcomes such as low birth weight, and is increasingly believed to exacerbate lung cancer resulting in death.

Evidence of **short-term** exposure to PM_{2.5} is best developed for cardiovascular mortality and non-fatal cardiovascular events [72]. Documented short-term morbidity outcomes associated with PM_{2.5} include a one day lag in hospitalizations and emergency department visits for ischemic heart disease and congestive heart failure following a spike in PM_{2.5} concentrations. A region of 5 million people can expect one premature cardiovascular death for every 10 µg/m³ increase in PM_{2.5} during the preceding day [72]. Causal respiratory outcomes are less certain but include emergency room visits and hospitalizations for COPD and respiratory infections [69].

Long-term exposure to PM_{2.5} also increases the risk of cardiovascular and cardiopulmonary mortality [72]. A recent review suggests chronic exposure to PM_{2.5} increases the nonaccidental risk of death by 6%, cardiovascular death by 12–14%, and lung cancer death by 15–21% for every increase in 10 µg/m³ [88].

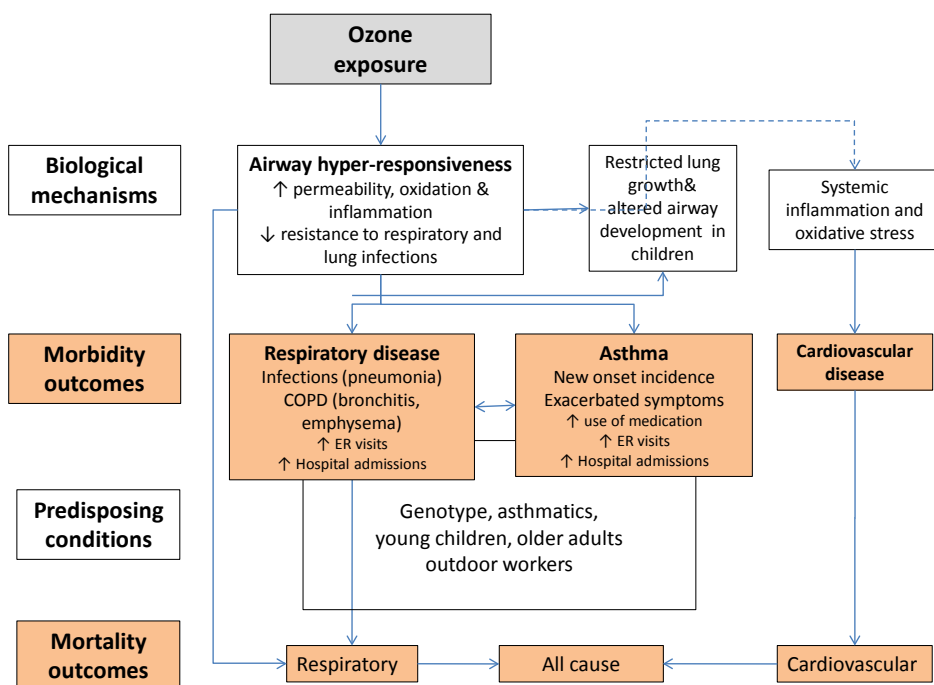
Morbidity outcomes associated with long-term exposure include: bronchitis in children, chronic bronchitis in adults over 30 years, asthma attacks, cardiovascular and respiratory hospital admissions, urgent care or emergency department visits due to asthma and cardiovascular disease, and restricted activity days for adults [71].

Emerging multi-pollutant models suggest pulmonary and respiratory responses associated with PM_{2.5} may be due to highly correlated exposure to co-pollutants such as ozone [73]. Yet the linear relationship between PM_{2.5} exposure and cardiovascular mortality hold at all levels for both short and long-term relationships [71, 72]. This implies **there is no level at which exposure to PM_{2.5} is safe** and that **all reductions in PM_{2.5} would be expected to have similar rates of reduction in death and disease**.

Health pathways for ozone

Ground-source ozone is documented to cause short-term airway hyper-responsiveness including increased permeability, oxidation and inflammation. (See Figure E.2.) Exposure to ozone can result in decreased resistance to respiratory and lung infections. Over time, this may restrict lung growth in children (an asthma risk), alter the airway, and stress the cardiovascular system [70].

FIGURE E.2 Pathway diagram- Ozone exposure and health outcomes



The relationship linking respiratory effects to **short term** exposure of ozone is well documented. Short-term health outcomes include respiratory mortality and morbidity as measured by respiratory and cardiovascular hospital admissions. Exposure to ozone has also been shown to increase new onset asthma, asthma symptoms, medication use, emergency room visits, and hospitalizations [70, 71].

Analysis of longitudinal cohorts also documents a likely causal effect on mortality and morbidity from **long-term** exposure to ozone. Research shows the strongest associations between long-term exposure and respiratory morbidity and mortality, with a 4% increase in risk for every 10 ppb exposure. Any secondary cardiovascular effects may be due to the correlation between ozone and PM_{2.5} [73]. Other

research suggests that mortality risk increases with ozone exposure in populations with predisposing conditions such as COPD, diabetes and congestive heart failure. Research also supports the conclusion that long-term ozone exposure exacerbates asthma incidence, severity and hospitalization [70, 71].

Analysis of local cardiovascular and respiratory conditions

Ozone and PM_{2.5} have a significant effect on cardiovascular and respiratory conditions. While PM_{2.5} may be more directly linked to cardiovascular outcomes and ozone to respiratory outcomes, the presence of either pollutant can cause and exacerbate both types of health effects.

Many people suffer from heart disease in the Portland region. According to BRFSS, approximately 3% of adults in the region have had a heart attack; a similar number suffer from chest pain or heart disease and 2.7% report having suffered a stroke. These three cardiovascular conditions are highly associated with risk factors such as physical inactivity, high blood pressure, high cholesterol and high BMI (weight). Recent BRFSS data also shows that approximately 28% of adults report high blood pressure and 36% have had a high cholesterol reading in the past five years. Nearly 40% of adults report not meeting the recommended 150 minutes of aerobic physical activity per week. More than 35% are overweight and nearly 24% are obese [8].

Prevalence⁽¹⁾ of adults who have suffered from heart attack, angina and stroke in Oregon and the three-county Portland region

	Heart attack	Angina (chest pain from heart disease)	Stroke
Oregon	3.6%	3.6%	2.9%
Clackamas	3.3%	2.8%	2.8%
Multnomah	3.0%	2.9%	2.7%
Washington	2.6%	2.9%	3.0%

(1) 2011 BRFSS

Cardiovascular disease is costly to treat. Oregon Hospital Discharge Index data in 2008 showed hospitalization charges for heart attacks averaged about \$40,000 [89]. The CDC estimates from the Chronic Disease Cost Calculator put the annual direct medical costs at over \$1.5 billion for the Portland metropolitan area. Approximately \$620 million of the region’s cardiovascular costs are associated with Medicare and Medicaid patients which make up 14 and 15% of the Oregon population [10, 11].

Respiratory illness also significantly degrades quality of life. Conditions such as asthma and COPD are caused and/or exacerbated by poor air quality. A little more than 5% of adults report having COPD. More than 9% of Portland region adults report a current asthma condition making the Oregon adult rate the sixth highest in the country [8, 9]. At least 7–8% of children in Oregon have asthma according to parental response and when teens are directly surveyed, the prevalence increases to 10% [9].

Controlling asthma can be difficult and costly. Most asthma patients fill multiple prescriptions regularly. When medications are not adequately controlling symptoms, patients use the emergency department

and hospital system. For every four asthma visits to the emergency department, at least one results in a hospitalization. The average cost of an asthma hospitalization is approximately \$14,300. In 2011, this resulted in over \$15 million in charges and taxpayers were asked to pay nearly \$10 million for Medicaid and Medicare patients [9].

Costs (charges) of asthma hospitalization, 2011

		Clackamas	Multnomah	Washington	Three-county	Oregon(1)
Average cost of hospitalization						\$14,300
Total costs	Medicaid/OHP	\$677,661	\$2,681,673	\$999,123	\$4,358,457	\$8,000,000
	Medicare	\$872,489	\$3,452,655	\$1,286,371	\$5,611,514	\$10,300,000
	All payment sources	\$2,371,813	\$9,385,857	\$3,496,931	\$15,254,601	\$28,000,000

(1) Source: All-Payers, All Claims Database[9]

Analysis of local PM_{2.5} and ozone conditions

The EPA sets National Ambient Air Quality Standards (NAAQS) Rules to regulate PM_{2.5} and ozone.⁹ These are provided below. Routinely exceeding the NAAQS will result in regulatory action including mandated completion of attainment plans.

Current U.S. EPA NAAQS for NO_x, ozone and PM

Pollutant [final rule cite]	Primary/ secondary	Averaging time	Level	Form
Ozone [73 FR 16436, Mar 27, 2008]	Primary and secondary	8-hour	0.075 ppm (3)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution PM _{2.5} Dec 14, 2012	Primary	Annual	12 µg/m ³	annual mean, averaged over 3 years
	Secondary	Annual	15 µg/m ³	annual mean, averaged over 3 years
	Primary and secondary	24-hour	35 µg/m ³	98th percentile, averaged over 3 years

Source: www.epa.gov/air/criteria.html 8/23/13

⁹ It is important to consider that NAAQS are routinely revised and almost always become more stringent as scientific evidence builds. For instance, the Federal Clean Air Science Advisory Committee reviewing evidence before the 2008 EPA NAAQS rule of 0.075 ppm recommended a standard in the 0.060-0.070 ppm range. The court has upheld the 0.075 ppm rule, but most health experts would lower the standard to 0.060 ppm or below. The EU has a non-binding rule of no more than 25 days at or above 0.060 ppm; UK rules suggest levels below 0.050 ppm all but 10 days of the year.

In general, the Portland metropolitan area is well within attainment. The yearly average of PM_{2.5} has ranged between 6.3 and 9.8 µg/m³ over the past decade. A yearly average of 2012 day-time ozone levels is approximately 0.033 ppm. While these levels are within attainment, this chronic exposure results in long-term illness and death.

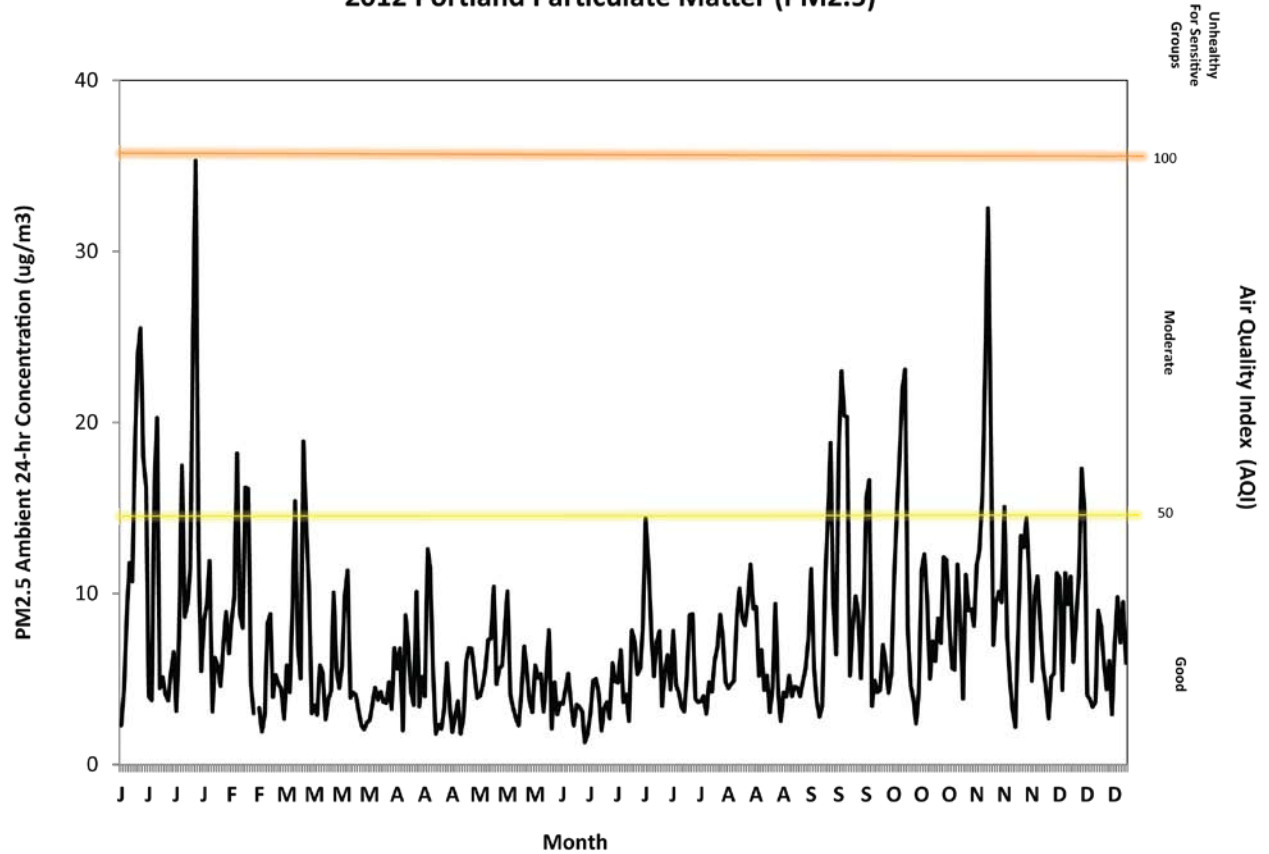
The CDC's National Environmental Health Tracking [90] program provides county-specific estimates of mortality reduction in all-cause and coronary heart disease death associated with chronic exposure to PM_{2.5}. This tool estimates that a 10% reduction in PM_{2.5} from 2009 levels (yearly mean = 7.8 µg/m³) would result in a 0.5% decrease in all-cause mortality and a 2.2% decrease in cardiovascular mortality. This is the equivalent of 57 annual deaths, 31 of them from coronary heart disease, in the three-county Portland region [90]. Another highly influential and cited study found that every 10 ppb increase in ozone results in a 1.040 (1.013–1.067) relative risk of respiratory death even after controlling for PM_{2.5} effects [73].

Another recent study used the epidemiological evidence to estimate sector-specific deaths attributed to long-term exposure to PM_{2.5} and ozone. Oregon-specific mortality rates were estimated. According to this study, road transportation-related PM_{2.5} — including both heavy duty diesel and light duty vehicles — causes more than 108 cardiovascular and lung cancer deaths and ozone causes more than 15 premature respiratory deaths within the UGB each year [87].

The NAAQS for PM_{2.5} and ozone also help protect against acute health effects associated with high short-term exposure. The EPA has also developed an Air Quality Index (AQI) as a public communication tool to advise when air quality is poor enough to warrant behavior modification. AQIs are forecasted using meteorological data to predict when weather patterns will result in short term spikes in PM_{2.5} (winter inversion layers) and ozone (hot summer days).

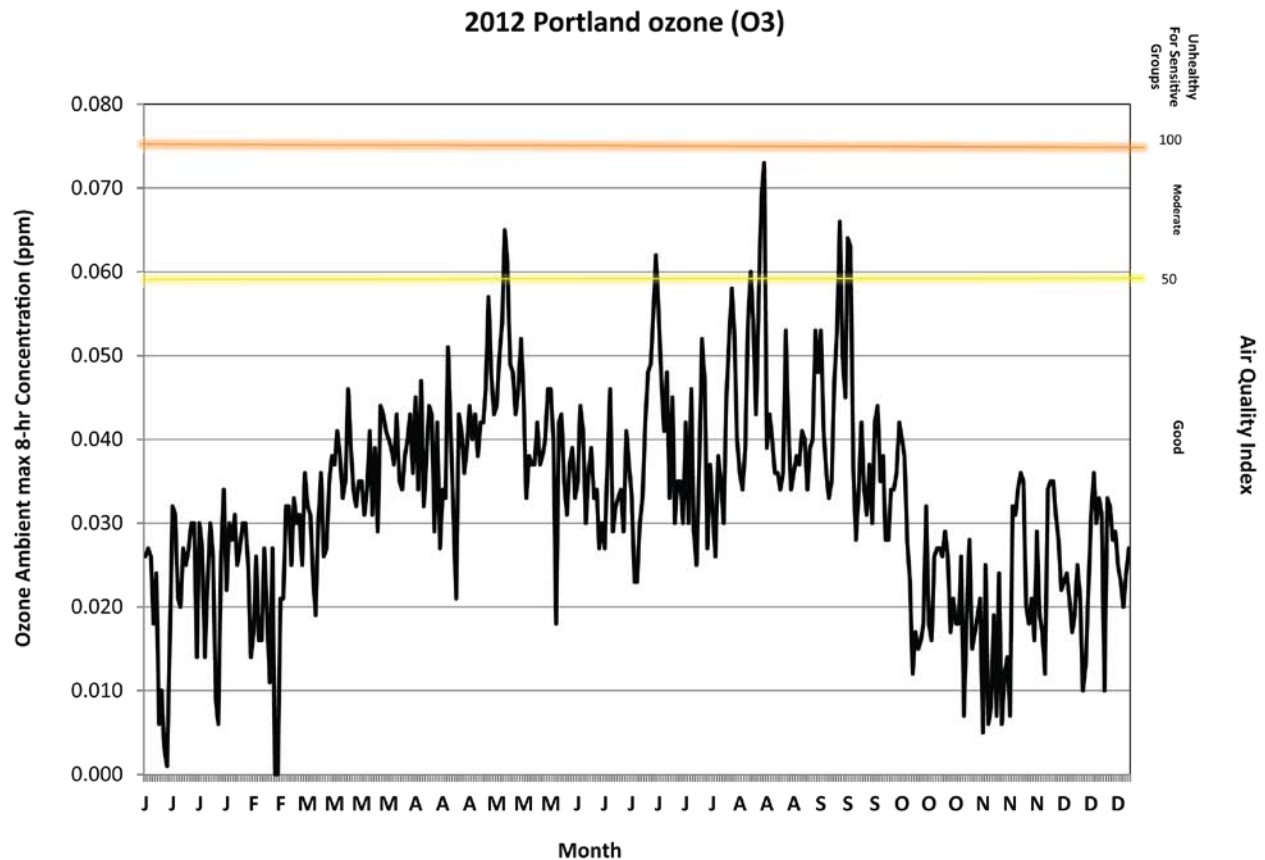
The graphs below provide daily maximum 24-hour PM_{2.5} and 8-hour ozone averages and the associated AQI as recorded in the southeast Portland metropolitan region in 2012. The region is NAAQS compliant because there are few, if any, short-term spikes of PM_{2.5} above 35 µg/m³ or ozone above 0.075 ppm.

2012 Portland Particulate Matter (PM2.5)



Source: Oregon DEQ, 2012

The AQI categories suggest that any value below 50 is ‘good’ for public health and values between 50 and 100 are only of ‘moderate’ concern. However, the public health literature increasingly suggests that all levels of PM_{2.5} and ozone are of concern. There is no level at which PM_{2.5} does not affect health. It is also widely recognized that any threshold for which ozone does not degrade health “is likely to lie below 0.045 ppm” and may be lower than even 0.035 ppm [71]. Warmer summers from weather events and climate change may result in even higher ozone levels.



Source: Oregon DEQ, 2012

Short-term AQI levels between 50 and 100 produce measurable impacts in cardiovascular and respiratory illness and death. These short-term air-quality ‘episodes’ may be weather-driven, but are still of great public health concern, particularly for vulnerable populations including those with high cardiovascular or respiratory risks and populations exposed to higher localized concentrations near busy roads and highways.

To understand the impact of short-term, acute exposure in the moderate AQI range, we considered the impact of PM_{2.5} episodes¹⁰ on one high-severity endpoint: death from a heart attack. A day or even hours of elevated PM_{2.5} exposure can trigger a heart attack in populations with underlying heart disease risk factors. In 2012, the region recorded five PM_{2.5} episodes where concentrations were well above 20 µg/m³ for multiple days. For an area of 1.5 million people, every three-day PM_{2.5} episode results in approximately one premature cardiovascular death triggered by a heart attack.¹¹ In the U.S., 15.2% of

¹⁰ Defined as multiple days with PM_{2.5}>15 µg/m³ with at least one of the days >20 µg/m³.

¹¹ The American Heart Association (Brook et al, 2010) states that every day with a 10 µg/m³ increase in PM_{2.5} results in a one day lag of one premature cardiovascular death per 5 million people.

heart attacks result in death within 30 days [91]. In 2012, the Portland region likely experienced approximately 30 preventable heart attacks, five resulting in death, due to elevated exposure during PM_{2.5} episodes.

A comparable exercise could be carried out for other cardiovascular endpoints for PM_{2.5} episodes. Additional analysis would also tell a similar story for respiratory conditions such as asthma during ozone episodes. For example, a recent study of 1.2 million children under age six in New York State found the risk of respiratory and asthma hospitalization increased by 22% for every 0.001 ppm increase in mean ozone during the warm season and 68% on days with ozone was greater than 0.070 ppm even after controlling for 13 socio-economic, familial and weather variables [92].

Air toxics

Air toxics refer to the suite of pollutants in the air from a variety of sources, including industrial processes, transportation and wood burning stoves. This section briefly summarizes the 2012 Oregon Department of Environmental Quality (DEQ) Portland Air Toxics Solutions (PATS) report and effort and focuses on air toxics most associated with light-duty cars and trucks [75]. The table below lists the pollutants associated with light duty vehicles. It also lists possible health effects including EPA's cancer risk classification and the toxicological evidence.

Onroad mobile air toxic pollutants and health effects

Pollutant	Health effects	Toxicological evidence - animal (A) or human (H)
Acrolein	General respiratory congestion; eye, nose, and throat irritation	A, H
Arsenic	Known (Class A) human carcinogen (lung); irritation of skin and mucous membranes	A, H
Benzene	Known (Class A) human carcinogen (leukemia); anemia, blood disorders, immune system damage	A, H
1,3-Butadiene	Probable human carcinogen (leukemia); cardiovascular disease	H
Chromium VI	Known (Class A) human carcinogen (lung); respiratory tract damage and disease	H
Ethyl benzene	Respiratory irritation, central nervous system	A
Formaldehyde	Probable (Class B1) human carcinogen (lung & nasal); respiratory irritation	H
Naphthalene	Possible (Class C) human carcinogen; eye and retina damage	A, H
Polycyclic aromatic hydrocarbons (PAH)	Varies depending on compound; 7 are probable (Class B2) carcinogens	

Inorganic arsenic, benzene, and chromium IV are all listed as Class A, known carcinogens. 1,3-Butadiene, a probable human carcinogen, is highly attributable to light-duty vehicle exposure. Epidemiological studies have shown arsenic and chromium increase the risk of lung cancer. Similar studies have shown that benzene increases the risk of blood disorders including leukemia. 1,3-Butadiene also increases the risk of leukemia and may increase cardiovascular effects. The EPA lifetime carcinogenic unit risks for each pollutant are shown below.

Lifetime carcinogenic risk for inhaled exposure

Pollutant	Primary cancer type	Unit risk
1, 3-Butadiene	Leukemia	3E-3 per $\mu\text{g}/\text{m}^3$ (0.08 per ppm)
Arsenic	Lung	4.3E-3 per 1 $\mu\text{g}/\text{m}^3$ (1)
Benzene	Leukemia, primarily acute myeloid	2.2E-6 to 7.8E-6 per 1 $\mu\text{g}/\text{m}^3$
Chromium VI	Lung	1.2E-2 per 1 $\mu\text{g}/\text{m}^3$

Source: www.epa.gov/iris/

(1) may increase in $>2 \mu\text{g}/\text{m}^3$ exposure settings

Current conditions

Oregon has adopted ambient benchmarks significantly lower than the lifetime carcinogenic risk in an effort to reduce health risks. (See www.deq.state.or.us/aq/toxics/docs/abcRuleFinal.pdf.) These

benchmarks are meant to protect the public — including more sensitive groups such as the elderly and children — from health outcomes beyond cancer.

Oregon’s Department of Environmental Quality (DEQ) monitors air toxics within the Metro region. DEQ recently modeled expected pollutant levels in 2017 for 19 pollutants and compared the results to benchmarks. Select results of this modeling exercise are provided in the table below.

Air toxics in the Portland metropolitan region

Pollutant	Current levels µg/m ³	Oregon benchmark		Modeled 2017 (1)	
		µg/m ³	% Reduction	% Attributable to onroad mobile	% Attributable to light duty
Acrolein	0.131	0.02	84.7%	3	1.9
Arsenic	0.000558	0.0002	64.2%	28	10.1
Benzene	0.956	0.13	86.4%	13	12.4
1,3-Butadiene	0.249	0.03	88.0%	64	56.3
Chromium VI	0.000107	0.00008	25.2%	59	54.9
Diesel pm	1.117	0.1	91.0%	16	0
Ethyl benzene	0.631	0.4	36.6%	32	30.4
Formaldehyde	0.667	0.077	88.5%	8	5.0
Naphthalene	0.159	0.03	81.1%	10	6.2
Polycyclic aromatic hydrocarbons (PAH)	0.018	0.0009	95.0%	10	2.8-6.2

(1) Oregon DEQ (2011) Air Toxics Pollutant Summaries. 6/2/11.

Metro’s Climate Smart Communities Scenarios Project is focused on light-duty vehicles. Significant reductions in vehicle miles traveled and gasoline fuel consumption are expected to help reduce air toxic pollutants with large portions attributed to light-duty, gasoline vehicles. These pollutants include a suite of 15 PAHs (2.8–6.2%), arsenic (10.1%), benzene (12.4%), ethyl benzene (30.4%), chromium VI (54.9%), and 1,3 butadiene (56.3%).

The scenarios under consideration are projected to reduce GHG emissions by 12, 24 and 36% respectively. The corresponding estimated decrease in PM_{2.5} is 2.8, 3.2 and 3.5%. It is beyond the scope of this analysis to determine how individual air toxic pollutants will change under the scenarios given the limitations of ODOT’s GreenSTEP model and the ITHIM methodology. Air toxics should decrease by at least the amount projected for PM_{2.5} and may follow a trajectory closer to the GHG reduction targets depending on the pollutant. Further analysis would be needed to determine how the preferred alternative aligns with Oregon adopted ambient benchmark concentrations for the pollutants monitored under PATS.

REFERENCES

1. National Climate Assessment Development Advisory Committee, *Draft Third National Climate Assessment Report*. 2013, U.S. Global Change Research Program: Washington DC.
2. Woodcock, J., et al., *Public health benefits of strategies to reduce greenhouse-gas emissions: urban land transport*. *Lancet*, 2009. **374**(9705): p. 1930-43.
3. World Health Organization, *Preamble to the Constitution of the World Health Organization*. Official Records of the World Health Organization, 1946. **2**: p. 100.
4. Green, M., et al., *Climate Smart Communities Scenarios Health Impact Assessment*. 2013, Oregon Health Authority: Portland, OR.
5. Lim, S., et al., *A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010*. *Lancet*, 2012. **380**(9859): p. 2224-2260
6. Oregon Health Authority, *What is Killing Oregonians: the Public Health Perspective(s)*. CD Summary, 2012. **61**.
7. Oregon Public Health Division, *Oregon Vital Statistics Annual Report 2010*, Center for Health Statistics, Editor. 2013: Portland Oregon.
8. Centers for Disease Control and Prevention, *Behavioral Risk Factor Surveillance System Survey Data*. 2011, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention: Atlanta, Georgia.
9. Oregon Asthma Program, *The Burden of Asthma in Oregon: 2013*. 2013.
10. Centers for Disease Control and Prevention, *Chronic Disease Cost Calculator*. 2013: Atlanta, Georgia.
11. Henry J Kaiser Family Foundation, *State Health Facts: Health Insurance Coverage of the Total Population - Oregon*. 2010-2011.
12. Oregon Health Authority, *Vital Statistics Annual Report: Total Death Rates for Selected Causes by Age, Oregon Residents, 2010*. 2010.
13. Berrigan, D., et al., *Active transportation increases adherence to activity recommendations*. *American Journal of Preventive Medicine*, 2006. **31**(3): p. 210 - 216.
14. Morency, C. and M. Demers, *Active transportation as a way to increase physical activity among children*. *Child care, health and development*, 2009. **36**(3): p. 421 - 427.
15. Gordon-Larsen, P., M.C. Nelson, and K. Beam, *Associations among active transportation, physical activity, and weight status in young adults*. *Obesity Research*, 2005. **13**(5): p. 868 - 875.
16. Moore, S.C., et al., *Leisure Time Physical Activity of Moderate to Vigorous Intensity and Mortality: A Large Pooled Cohort Analysis* *PLoS Med*, 2012. **9**(11): p. e1001335.
17. McConville and e. al, *Disaggregate land uses and walking*. *Am J Prev Med*, 2011. **40**(1): p. 25-32.
18. Mumford and e. al, *Changes in physical activity and travel behaviors in residents of a mixed-use development*. *Am J Prev Med*, 2011. **41**(5): p. 504-7.
19. Hirsch and e. al, *Discrete Land Uses and Transportation Walking in Two U.S. Cities: The Multi-Ethnic Study of Atherosclerosis*. *Health & Place*, 2013. **Web Preview**.
20. Durand and e. al, *A systematic review of built environment factors related to physical activity and obesity risk; implications for smart growth urban planning*. *Obesity Reviews*, 2011. **12**.
21. Brown, B., et al., *Neighborhood design for walking and biking: physical activity and body mass index*. *Am J Prev Med*, 2013. **44**(3): p. 231-8.

22. Hoehner et al, *Commuting Distance, Cardiorespiratory Fitness, and Metabolic Risk*. Am J Prev Med, 2012. **42**(6): p. 571-578.
23. Frank, L.D., et al., *Stepping towards causation: Do built environments or neighborhood and travel preferences explain physical activity, driving, and obesity?* Social Science & Medicine, 2007. **65**: p. 1898 - 1914.
24. Blumenberg, E. and M. Manville, *Beyond the Spatial Mismatch: Welfare Recipients and Transportation Policy*. Journal of Planning Literature, 2004. **19**(2).
25. Bernard, P., et al., *Health inequalities and place: A theoretical conception of neighbourhood*. Social Science & Medicine, 2007. **65**(9): p. 1839-1852.
26. Lopez, R. and H. Hynes, *Obesity, physical activity and the urban environment: public health research needs*. Environ Health, 2006. **5**(25).
27. Taylor, W. and D. Lou, *Do All Children Have Places to Be Active? Disparities in Access to Physical Activity Environments in Racial and Ethnic Minority and Lower-Income Communities in Research Briefs & Syntheses*. 2011, Active Living Research, a National Program of the Robert Wood Johnson Foundation: Princeton, NJ.
28. Morency, P., et al., *Neighborhood Social Inequalities in Road Traffic Injuries: The Influence of Traffic Volume and Road Design*. American Journal of Public Health 2012. **102**(6): p. 1112-1119.
29. Carver, A., A. Timperio, and D. Crawford, *Do attributes of the physical environment influence children's physical activity: a review*. Health and Place, 2008. **14**(2): p. 217-227.
30. Weir, L., D. Etelson, and D. Brand, *Parents' perceptions of neighborhood safety and children's physical activity*. Prev Med, 2006. **43**(3): p. 212-217.
31. James et al, *Urban sprawl, physical activity and body mass index; Nurses' Health Study and Nurses' Health Study II*. Am J Public Health, 2013. **103**(2): p. 369-75.
32. Griffin et al, *The relationship between urban sprawl and coronary heart disease in women*. Health & Place, 2013. **20**: p. 51-61.
33. Schepers, J.P. and E. Heinen, *How does a modal shift from short car trips to cycling affect road safety?* Accid Anal Prev, 2012.
34. Figliozzi, M., et al., *School Commute Air Quality: Understanding Variation in Pollutant Exposure for Students Traveling to School by Auto, Bus, or Walking*. 2012, Portland State University: Portland, OR.
35. Lachapelle, U., et al., *Commuting by public transit and physical activity: where you live, where you work, and how you get there*. J Phys Act Health, 2011. **8 Suppl1**: p. S72-82.
36. Lachapelle, U. and L.D. Frank, *Transit and health: Mode of transport, employer-sponsored public transit pass programs, and physical activity*. Journal of Public Health Policy, 2009. **30**: p. S73 - S94.
37. Besser, L.M. and A.L. Dannenberg, *Walking to public transit: Steps to help meet physical activity recommendations*. American Journal of Preventive Medicine, 2005. **29**(4): p. 273 - 280.
38. MacDonald, J., et al., *The Effect of Light Rail Transit on Body Mass Index and Physical Activity*. Am J Prev Med, 2010. **39**(2): p. 105-112.
39. Hess, D.B., *The effects of free parking on commuter mode choice: Evidence from travel diary data*, in *Working Paper Series*,. 2001, UC Los Angeles: Los Angeles.
40. Pucher, J., J. Dill, and S. Handy, *Infrastructure, programs, and policies to increase bicycling: an international review*. Prev Med, 2010. **50 Suppl 1**: p. S106-25.
41. Levy, J., J. Buonocore, and K. von Stackelberg, *Evaluation of the public health impacts of traffic congestion: a health risk assessment*. Environ Health, 2010. **9**(65).

42. Christian, T., *Trade-offs between commuting time and health-related activities*. J Urban Health, 2012. **89**(5): p. 746-57.
43. Lee, I.M., et al., *Physical activity and weight gain prevention*. JAMA, 2010. **303**(12): p. 1173-9.
44. Wareham, N., E. van Sluijs, and U. Ekelund, *Physical activity and obesity prevention: a review of the current evidence*. Proc Nutr Soc, 2005. **64**: p. 229-247.
45. U.S Department of Health and Human Services, *Physical Activity Fundamental to Preventing Disease*, Office of the Assistant Secretary for Planning and Evaluation, Editor. 2002.
46. Naci, H., *Comparative effectiveness of exercise and drug interventions on mortality outcomes: metaepidemiological study*. British Medical Journal, 2013. **347**: p. f5577.
47. U.S. Department of Health and Human Services, *2008 Physical Activity Guidelines for Americans*. 2008.
48. Boarnet, M., et al., *The Exposition Light Rail Line Study: A Before-and-After Study of the Impact of New Light Rail Transit Service*. 2012.
49. McMillan, T., *Walking and Biking to School, Physical Activity and Health Outcomes*, in *Research Brief*, A.L. Research, Editor. 2009.
50. U.S. Department of Transportation, *Guidance on Treatment of the Economic Value of a Statistical Life in the U.S. Department of Transportation Analyses*. 2013: Washington DC.
51. Bhatia, R. and M. Wier, "Safety in Numbers" re-examined: can we make valid or practical inferences from available evidence? *Accid Anal Prev*, 2011. **43**(1): p. 235-40.
52. Jacobsen, P.L., *Safety in numbers: more walkers and bicyclists, safer walking and bicycling*. Inj Prev, 2003. **9**(3): p. 205-9.
53. Minikel, E., *Cyclist safety on bicycle boulevards and parallel arterial routes in Berkeley, California*. *Accid Anal Prev*, 2012. **45**: p. 241-7.
54. Rojas-Rueda, D., et al., *The health risks and benefits of cycling in urban environments compared with car use: health impact assessment study*. *BMJ*. **343**: p. d4521.
55. de Hartog, J., et al., *Do the health benefits of cycling outweigh the risks?* *Environmental Health Perspectives*, 2010. **118**: p. 1109-1116.
56. de Nazelle, A., et al., *Improving health through policies that promote active travel: a review of evidence to support integrated health impact assessment*. *Environ Int*, 2011. **37**(4): p. 766-77.
57. Retting, R.A., S.A. Ferguson, and A.T. McCartt, *A review of evidence-based traffic engineering measures designed to reduce pedestrian-motor vehicle crashes*. *Am J Public Health*, 2003. **93**(9): p. 1456-63.
58. Jones, S.J., et al., *Traffic calming policy can reduce inequalities in child pedestrian injuries: database study*. *Inj Prev*, 2005. **11**(3): p. 152-6.
59. Bunn, F., et al., *Area-wide traffic calming for preventing traffic related injuries*. *Cochrane Database Syst Rev*, 2003(1): p. CD003110.
60. Hoffman, M.R., et al., *Bicycle commuter injury prevention: it is time to focus on the environment*. *J Trauma*, 2010. **69**(5): p. 1112-7; discussion 1117-9.
61. Rosso, A.L., A.H. Auchincloss, and Y.L. Michael, *The urban built environment and mobility in older adults: a comprehensive review*. *J Aging Res*, 2011.
62. Rothman, L., et al., *Pedestrian crossing location influences injury severity in urban areas*. *Inj Prev*, 2012.
63. Koepsell, T., et al., *Crosswalk markings and the risk of pedestrian-motor vehicle collisions in older pedestrians*. *JAMA*, 2002. **288**(17): p. 2136-43.
64. Reynolds, C.C., et al., *The impact of transportation infrastructure on bicycling injuries and crashes: a review of the literature*. *Environ Health*, 2009. **8**: p. 47.

65. Larsen, K., et al., *The Influence of the Physical Environment and Sociodemographic Characteristics on Children's Mode of Travel to and From School*. Am J Public Health, 2009. **99**(3): p. 520-526.
66. Timperio, A., et al., *Perceptions about the local neighborhood and walking and cycling among children*. Prev Med, 2004. **38**(1): p. 39-47.
67. Dill, J. and N. McNeil, *Four Types of Cyclists? Testing a Typology to Better Understand Bicycling Behavior and Potential*. 2012, Portland State University, Nohad A. Toulan School of Urban Studies & Planning.
68. U.S. Environmental Protection Agency, *Integrated Science Assessment for Oxides of Nitrogen - Health Criteria*. 2008: Washington DC.
69. U.S. Environmental Protection Agency, *Integrated science assessment for particulate matter (final report)*. 2009: Washington, D.C.
70. U.S. Environmental Protection Agency, *Integrated Science Assessment for Ozone and Related Photochemical Oxidants*. 2013: Washington DC.
71. World Health Organization, *Review of Evidence on Health Aspects of Air Pollution: REVIHAAP Project*. 2013, WHO Regional Office for Europe: Copenhagen, Denmark.
72. Brook, R.D., et al., *Particulate matter air pollution and cardiovascular disease: An update to the scientific statement from the American Heart Association*. Circulation, 2010. **121**: p. 2331-2378.
73. Jerrett, M., et al., *Long-Term Ozone Exposure and Mortality*. N Engl J Med, 2009. **360**: p. 1085-95.
74. Oregon Department of Environmental Quality. *Air Quality and Toxics*. [cited 3/25/13]; Available from: <http://www.deq.state.or.us/aq/toxics/pats.htm>.
75. Oregon Department of Environmental Quality, *Portland Air Toxics Solutions Committee Report and Recommendations*. 2012.
76. Van Atten, C., et al., *Assessing population exposures to motor vehicle exhaust*. Rev Environ Health, 2005. **20**(3): p. 195-214.
77. U.S. Environmental Protection Agency, *Framework for Cumulative Risk Assessment*, R.A. Forum, Editor. 2003: Washington, DC.
78. Corburn, J., *Environmental Justice, Local Knowledge, and Risk: The Discourse of a Community-Based Cumulative Exposre Assessment*. Environmental Management, 2002. **29**(4): p. 451-466.
79. Holm, A.L., C. Glumer, and F. Diderichsen, *Health Impact Assessment of increased cycling to place of work or education in Copenhagen*. BMJ Open. **2**(4).
80. Briggs, D.J., et al., *Effects of travel mode on exposures to particulate air pollution*. Environ Int, 2008. **34**(1): p. 12-22.
81. Gulliver, J. and D.J. Briggs, *Personal exposure to particulate air pollution in transport microenvironments*. Atmospheric Environment, 2004. **38**(1): p. 1-8.
82. Hatzopoulou, M., et al., *The impact of traffic volume, composition, and road geometry on personal air pollution exposures among cyclists in Montreal, Canada*. J Expo Sci Environ Epidemiol, 2012.
83. Rank, J., J. Folke, and P.H. Jespersen, *Differences in cyclists and car drivers exposure to air pollution from traffic in the city of Copenhagen*. Sci Total Environ, 2001. **279**(1-3): p. 131-6.
84. Zuurbier, M., et al., *Commuters' exposure to particulate matter air pollution is affected by mode of transport, fuel type, and route*. Environ Health Perspect, 2010. **118**(6): p. 783-9.
85. Zuurbier, M., et al., *Respiratory effects of commuters' exposure to air pollution in traffic*. Epidemiology, 2011. **22**(2): p. 219-27.
86. Kim, J.J., et al., *Residential traffic and children's respiratory health*. Environ Health Perspect, 2008. **116**(9): p. 1274-9.

87. Caiazzo, F., et al., *Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005*. Atmospheric Environment, 2013. **79**(198): p. e208.
88. Chen, H., M.S. Goldberg, and P.J. Villeneuve, *A systematic review of the relation between long-term exposure to ambient air pollution and chronic diseases*. Rev Environ Health, 2008. **23**(4): p. 243-97.
89. Oregon Health Authority, *Heart Disease and Stroke in Oregon: Update – 2010*, Office of Disease Prevention and Epidemiology, Editor. 2011.
90. Centers for Disease Control and Prevention. *National Environmental Public Health Tracking Network*. 2013 [cited 2013 November 1, 2013]; Available from: <http://ephtracking.cdc.gov/showHome.action#>.
91. Centers for Medicare & Medicaid Services, *Hospital Compare*. 2013.
92. Lin, S., et al., *Chronic Exposure to Ambient Ozone and Asthma Hospital Admissions Rates among Children*. Environ Health Perspect, 2008. **116**(12): p. 1725-1730.



PUBLIC HEALTH DIVISION
Environmental Public Health
Center for Prevention and Health Promotion

This document can be provided upon request in an alternate format for individuals with disabilities or in a language other than English for people with limited English skills. To request this publication in another format or language, contact the Public Health Division at 971-673-1222, 971-673-0372 for TTY.

OHA 8613 (03/14)

BEFORE THE METRO COUNCIL

FOR THE PURPOSE OF ENDORSING THE) RESOLUTION NO. 14-4501
FEDERAL TRANSPORTATION REVENUE)
PROPOSAL INTRODUCED BY) Introduced by Councilor Dirksen, Chair of the
TRANSPORTATION FOR AMERICA) Joint Policy Advisory Committee on
Transportation

WHEREAS, Moving Ahead for Progress in the 21st Century (MAP-21) was adopted by Congress in 2012 for the period encompassing federal fiscal years 2013 and 2014; and

WHEREAS, MAP-21 is scheduled to expire at the end of federal fiscal year 2014 (September 30, 2014); and

WHEREAS, MAP-21 has a significant policy effect on transportation planning and decision-making and funding in the Portland metropolitan region; and

WHEREAS, the Joint Policy Advisory Committee on Transportation (JPACT) approved and the Metro Council adopted Resolution No. 13-4489 establishing a regional position on federal transportation policy; and

WHEREAS, the most important issue called for by Resolution No. 13-4489 is for a significant increase in federal transportation user fees to support reauthorization of MAP-21 both to eliminate the need for a subsidy of the Highway Trust Fund from the General Fund and to increase the level of federal transportation investment; and

WHEREAS, it is in the interest of Metro and JPACT to work with leaders of other regions responsible for addressing transportation needs; and

WHEREAS, the advocacy organization Transportation for America is comprised of interest groups, business, local governments and transit agencies that share a common interest in transportation investment; and

WHEREAS, Transportation for America has called on the US Congress to increase federal transportation user fees by \$30 billion per year to both eliminate the need for a subsidy of the Highway Trust Fund by the General Fund and increase the level of federal transportation investment; and

WHEREAS, the Joint Policy Advisory Committee on Transportation recommended adoption of the resolution at its _____ meeting; now therefore

BE IT RESOLVED that the Metro Council:

1. Endorses the proposal from Transportation for America to increase federal transportation user fees by \$30 billion per year to displace the dependence of the Highway and Transit Trust Funds on the General Fund and support growth in federal transportation investment.
2. Recognizes that other funding options may be considered that merit endorsement as well.

ADOPTED by the Metro Council this [insert date] day of [insert month] 2014.

Tom Hughes, Council President

Approved as to Form:

Alison R. Kean, Metro Attorney

STAFF REPORT

IN CONSIDERATION OF RESOLUTION NO. 14- 4501, FOR THE PURPOSE OF ENDORSING THE FEDERAL TRANSPORTATION REVENUE PROPOSAL INTRODUCED BY TRANSPORTATION FOR AMERICA

Date: January xx, 2014

Prepared by: Andy Cotugno, xt. 1763

BACKGROUND

Metro and the Joint Policy Advisory Committee on Transportation (JPACT) have consistently engaged in advocacy with the US Congress on matters of federal transportation policy. In December 2013, JPACT approved and the Metro Council adopted Resolution No. 13-4489 calling for an increase in federal transportation user fees and establishing a position on the use of those fee increases. The most significant priority called for in Resolution No. 13-4489 is to increase transportation user fees to both eliminate the need for a general fund subsidy and provide the resources for an increased federal investment in transportation.

Transportation for America (T4America) is an advocacy organization of interest groups, businesses, and governments and has proposed a \$30 billion per year increase in federal transportation user fees (Attachment 1). They have suggested any of the following as options to raise the \$30 billion per year:

1. A 17-cent addition to the existing 18.3 cent federal gas tax; or
2. Replacing the existing 18.3 cent federal gas tax with an 11% federal sales tax on gasoline; or
3. Imposition of a \$4 fee on each barrel of oil; or
4. Addition of a 5.5% federal sales tax on gasoline; or
5. Indexing the gas tax to construction costs and raising one of the options above but at a lower rate.

Another example, consistent with option 5 in the above list, could be implemented through HR 3636 – The “Update, Promote, and Develop America’s Transportation Essentials Act of 2013” (The UPDATE Act) and HR 3638 – The “Road Usage Fee Pilot Program Act of 2013.” Through HR 3636, the federal gas tax would be increased by 8-cents in 2014, by 4-cents in 2015 and by 3-cents in 2016. Further, it would be indexed for cost-of-living increases. Finally, the federal fuel tax would be terminated in 2024 to be replaced by a more stable funding source. Through HR 3638, the Secretary of the Treasury would be directed to manage a pilot program, providing grants to state and localities to test and evaluate a fee on vehicle miles driven to enable it to become the replacement to the fuel tax in 2024.

Attachment 2-A to this Staff Report provides information describing the current and expected General Fund subsidy to the Transit and Highway Trust Funds based upon continuing the practice established in MAP-21 to incorporate a modest inflation factor (1.8-2%) and subsidize the Trust Fund deficit with the General Fund. In addition, Attachment 2-B shows the consequence of eliminating this subsidy and drastically reducing the program **and** the impact of increasing transportation user fees by \$30 billion per year with the resulting increased investment in transportation. As shown in Attachment 2-A, the General Fund subsidy for the decade leading up to the current fiscal year (FFY 2014) has been over \$53 billion and it is expected this will balloon to over \$140 billion for the next decade. This is in addition to General Fund commitments of \$45 billion for transportation projects funded through the American Recovery and Reinvestment Act of 2009 (aka the Stimulus Bill), \$3.6 billion for the past five years of funding for the TIGER Program (Transportation Investment Generating Economic Recovery) and \$17.6 billion for the past decade of New Starts/Small Starts funding.

Overall, there has been an increasing dependence on this funding subsidy from the General Fund, placing continued reliance at great risk. If the practice were to **not** continue and the general fund subsidy were eliminated, on average it

would result in a 28% reduction of the program (Attachment 2-A). This would translate into an average annual reduction of funding from the Highway Trust Fund to Oregon of over \$130 million per year. A reduction of that magnitude is equivalent to nearly double the annual amount ODOT allocated for their entire statewide “Enhance” program as part of their recent 2015-2018 STIP update process. Conversely, increasing transportation user fees by \$30 billion per year in addition to displacing the need for a General Fund subsidy would allow the Highway Trust Fund program to grow by an average 26% per year. This would produce an increase to Oregon of funding from the Highway Trust Fund of an average \$145 million per year.

Furthermore, a portion of the FHWA funding to Oregon is sub-allocated to Metro/JPACT and is the source for the recent Flexible Funding allocation. Elimination of the General Fund subsidy would pass through a portion of the Oregon reduction resulting in a nearly \$10 million per year decrease in Flex Funds (from about \$40 million per year to about \$30 million per year). The Transportation for America proposed increase would produce an approximate \$12 million per year increase in Flex Funds. This potential reduction (of \$10 million per year) or increase (of \$12 million per year) is roughly equivalent in size to the 3-year Regional Economic Opportunity Fund which allocated \$34 million to projects region-wide in the FY 2016-18 Regional Flex Fund Allocation.

Finally, the impact on programs funded through the federal Transit Trust Fund is even more significant. While the New Starts/Small Start program has always been funded with General Funds (which is expected to continue), bus and bus-related and rail rehab programs have been funded through the Transit Trust Fund using the federal gas tax and other federal user fees. However, like the Highway Trust Fund, the General Fund has subsidized the Transit Trust Fund. Projected revenues to transit districts could be reduced an average of 43% per year, translating to an average reduction of \$24 million per year to TriMet and similar impacts to SMART and C-TRAN.

ANALYSIS/INFORMATION

1. **Known Opposition:** Increasing federal transportation funding is controversial and intertwined with the broader federal budget debate.
2. **Legal Antecedents:** Planning and policy conclusions developed through corridor and area plans must be adopted into the Regional Transportation Plan as a prerequisite for implementation. Federal funding to implement specific projects must be included in the Metropolitan Transportation Improvement Program.
3. **Anticipated Effects:** This action provides for the Portland region collaborating with other region’s with a similar federal policy objective.
4. **Budget Impacts:** A portion of Metro’s transportation planning budget is funded through the federal transportation program.

RECOMMENDED ACTION

Recommend adoption of Resolution No. 14-4501

General Fund Subsidy to the Highway and Transit Trust Funds

	General Fund Subsidy to the Transit and Highway Trust Funds	Transit and Highway Trust Fund Spending ¹	General Fund Share
--	---	--	--------------------

2005	\$0.0	\$39.9	0.0%
2006	\$0.0	\$35.9	0.0%
2007	\$0.0	\$39.2	0.0%
2008	\$8.0	\$43.0	18.6%
2009	\$7.0	\$44.9	15.6%
2010	\$19.5	\$39.4	49.5%
2011	\$0.0	\$44.5	0.0%
2012	\$0.0	\$49.3	0.0%
MAP 2013	\$6.2	\$49.4	12.6%
2014	\$12.6	\$50.2	25.1%
2015	\$14.0	\$51.1	27.4%
2016	\$14.0	\$52.3	26.8%
2017	\$13.7	\$53.4	25.7%
2018	\$14.3	\$54.7	26.1%
2019	\$15.0	\$55.9	26.8%
2020	\$16.0	\$57.3	27.9%
2021	\$17.0	\$58.6	29.0%
2022	\$17.6	\$60.0	29.3%
2023	\$18.7	\$61.5	30.4%

2015 to 2023 Average	\$15.6	\$56.1	27.7%
----------------------	--------	--------	-------

General Fund Subsidy to the Highway Trust Fund

	General Fund Subsidy to the Highway Trust Fund	Highway Trust Fund Spending ¹	General Fund Share
--	--	--	--------------------

2005	\$0.0	\$33.1	0.0%
2006	\$0.0	\$33.9	0.0%
2007	\$0.0	\$35.0	0.0%
2008	\$8.0	\$37.0	21.6%
2009	\$7.0	\$37.6	18.6%
2010	\$14.7	\$32.0	45.9%
2011	\$0.0	\$37.3	0.0%
2012	\$0.0	\$41.1	0.0%
MAP 2013	\$6.2	\$40.9	15.2%
2014	\$10.4	\$41.6	25.0%
2015	\$10.7	\$42.3	25.3%
2016	\$10.6	\$43.3	24.5%
2017	\$10.2	\$44.2	23.1%
2018	\$10.5	\$45.3	23.2%
2019	\$10.8	\$46.3	23.3%
2020	\$11.5	\$47.5	24.2%
2021	\$12.3	\$48.6	25.3%
2022	\$12.7	\$49.7	25.6%
2023	\$13.6	\$51.0	26.7%

2015 to 2023 Average	\$11.4	\$46.5	24.6%
----------------------	--------	--------	-------

General Fund Subsidy to the Transit Trust Fund

	General Fund Subsidy to the Transit Trust Fund	Transit Trust Fund Spending ¹	General Fund Share
--	--	--	--------------------

2005	\$0.0	\$6.8	0.0%
2006	\$0.0	\$2.0	0.0%
2007	\$0.0	\$4.2	0.0%
2008	\$0.0	\$6.0	0.0%
2009	\$0.0	\$7.3	0.0%
2010	\$4.8	\$7.4	64.9%
2011	\$0.0	\$7.2	0.0%
2012	\$0.0	\$8.2	0.0%
MAP 2013	\$0.0	\$8.5	0.0%
2014	\$2.2	\$8.6	25.6%
2015	\$3.3	\$8.8	37.5%
2016	\$3.4	\$9.0	37.8%
2017	\$3.5	\$9.2	38.0%
2018	\$3.8	\$9.4	40.4%
2019	\$4.2	\$9.6	43.8%
2020	\$4.5	\$9.8	45.9%
2021	\$4.7	\$10.0	47.0%
2022	\$4.9	\$10.3	47.6%
2023	\$5.1	\$10.5	48.6%

2015 to 2023 Average	\$4.2	\$9.6	43.0%
----------------------	-------	-------	-------

¹2005 - 2012: Actual Outlays

2013 - 2023: Expected spending Authority assuming 1.8-2% inflation

**Historical and Proposed Federal Transit and Highway Trust
Fund Spending Levels (\$ billions)**

	General Fund Subsidy to the Transit and Highway Trust Funds	Transit and Highway Trust Fund Spending without General Fund Subsidy	Percent Reduced Spending Level without General Fund Subsidy	Status Quo Transit and Highway Trust Fund Spending ¹ with General Fund Subsidy	Proposed Increase in Transportation User Fees to the Trust Fund	Elimination of General Fund Subsidy to the Trust Fund	Net Increase in Trust Fund Supported Programs	Increased Trust Fund Spending Level with Increased User Fees	Percent Increased Spending Level above Status Quo with inflation	
2005	\$0.0	n.a.		\$39.9						
2006	\$0.0	n.a.		\$35.9						
2007	\$0.0	n.a.		\$39.2						
2008	\$8.0	n.a.		\$43.0						
2009	\$7.0	n.a.		\$44.9						
2010	\$19.5	n.a.		\$39.4						
2011	\$0.0	n.a.		\$44.5						
2012	\$0.0	n.a.		\$49.3						
MAP 21	2013	\$6.2	n.a.	\$49.4						
	2014	\$12.6	n.a.	\$50.2						
	2015	\$14.0	\$37.1	-27.4%	\$51.1	\$30.0	\$14.0	\$16.0	\$67.1	31.3%
	2016	\$14.0	\$38.3	-26.8%	\$52.3	\$30.0	\$14.0	\$16.0	\$68.3	30.6%
	2017	\$13.7	\$39.7	-25.7%	\$53.4	\$30.0	\$13.7	\$16.3	\$69.7	30.5%
	2018	\$14.3	\$40.4	-26.1%	\$54.7	\$30.0	\$14.3	\$15.7	\$70.4	28.7%
	2019	\$15.0	\$40.9	-26.8%	\$55.9	\$30.0	\$15.0	\$15.0	\$70.9	26.8%
	2020	\$16.0	\$41.3	-27.9%	\$57.3	\$30.0	\$16.0	\$14.0	\$71.3	24.4%
	2021	\$17.0	\$41.6	-29.0%	\$58.6	\$30.0	\$17.0	\$13.0	\$71.6	22.2%
	2022	\$17.6	\$42.4	-29.3%	\$60.0	\$30.0	\$17.6	\$12.4	\$72.4	20.7%
	2023	\$18.7	\$42.8	-30.4%	\$61.5	\$30.0	\$18.7	\$11.3	\$72.8	18.4%
		2015-2023 Average Reduction		-27.7%				2015-2023 Average Increase	26.0%	

¹2005 - 2012: Actual Outlays
Expected spending Authority assuming 1.8-2% inflation

2013 - 2023:

ODOT 2016 - 2018 Enhance Project Allocation
Metro Region

E9	OR47:OR8 Intersection Improvements	\$2,341,382
E11	US 26: Cornelius Pass Road to NW 185th Avenue*	\$1,794,600
E13	King City Sidewalk Infill	\$913,839
E15	Boones Ferry Rd: Oakridge Rd/Reese Rd - Madrona St	\$4,000,000
E21	Connected Cully	\$2,994,624
E22	Downtown I-405 Pedestrian Safety and Operational Improvements	\$2,009,952
E32	St. Johns Truck Strategy Phase II	\$3,002,357
E48	Kinsman Road: Boeckman Rd - Barber Street	\$2,230,000
E60	Willamette Grnwy Trail: Chimney Park/Kelley Pt Park	\$1,580,511
E61	NE 238th Dr: Halsey St to Glisan St Freight and Multimodal Improvements	\$6,549,187
E64	Historic Columbia River Highway State Trail: Shellrock Mountain Crossing	\$5,473,530
	Historic Columbia River Highway State Trail: Summit Creek to Lindsey Creek	\$5,000,000
E70	I-5 NB: Lower Boones Ferry Exit-ramp	\$1,129,168
E71	I-5 SB: Lower Boones Ferry Exit to Lower Boones Ferry Entrance Auxiliary Lane	\$3,953,303
E81	Columbia_Alderwood_Cully**	\$4,959,856
E84	Barbur-99W Corridor Safety & Access to Transit	\$3,234,767
E86	Highway 8 Corridor Safety & Access to Transit	\$1,448,242
E87	Powell-Division Corridor Safety & Access to Transit	\$2,512,440
E94	OR217: Allen-Denney Southbound Split Diamond	\$5,330,744
	I-205 SB Auxiliary Lane: I-84 to Stark/Washington	\$700,000
	US 26: NW 185th to Cornelius Pass Road	\$8,000,000
	I-5 Rose Quarter Development	\$1,500,000
		<hr/>
	Total	\$70,658,502

2016-18 RFFA project and program recommendations

Local projects						
Sub-region	Project	Lead agency	Focus area	Phase	RFF request	Total Project Cost
Washington County	Canyon Road Streetscape and Safety Project	Beaverton	AT/CS	CONS	\$3,535,000	\$3,939,579
	Fanno Creek Trail: Woodard Park to Bonita Road and 85 th Avenue to Tualatin River Bridge	Tigard	AT/CS	CONS	\$3,700,000	\$4,600,000
	Beaverton Creek Trail Crescent Connection: Westside Trail to SW Hocken Avenue	THPRD	AT/CS	PD	\$800,000	\$4,733,812
	Tonquin Road/Grahams Ferry Road Intersection	Washington County	GE/FI	CONS	\$2,132,000	\$3,352,154
	Pedestrian Arterial Crossings	Washington County	AT/CS	PD	\$636,000	\$3,979,350
	US 26/Brookwood Interchange – Industrial Access Project	Hillsboro	REOF	CONS	\$8,267,000	\$35,000,000
City of Portland	N. Going to Swan Island Freight Improvements	Portland	GE/FI	CONS	\$500,000	\$557,227
	South Rivergate Freight Project	Portland	GE/FI	CONS	\$3,222,000	\$4,164,507
	OR 99W: SW 19th Avenue to 26th Avenue - Barbur Boulevard Demonstration Project	Portland	AT/CS	CONS	\$1,894,600	\$2,111,445
	Foster Road: SE Powell 90th Pedestrian/Bicycle/Safety Phase II	Portland	AT/CS	CONS	\$2,063,400	\$5,313,400 ⁽¹⁾
	Southwest in Motion (SWIM) Active Transportation Strategy	Portland	AT/CS	PLAN	\$272,000	\$303,132
	Portland Central City Multimodal Safety Project	Portland	AT/CS	PLAN/CONS	\$6,000,000	\$6,686,727
	East Portland Access to Employment and Education Multimodal Project	Portland	REOF	CONS	\$8,267,000	\$9,213,195
E. Multnomah County	Sandy Boulevard: NE 181st Avenue to East Gresham City Limits	Gresham	AT/CS	CONS	\$3,644,000	\$4,644,318
	NE 238 th Drive: Halsey Street to Glisan Street Freight and Multimodal Project	Multnomah County	REOF	PD	\$1,000,000	\$8,421,944 ⁽²⁾
	Troutdale Industrial Access Project	Port of	REOF	CONS	\$8,000,000	\$14,797,827

Notes: AT/CS - Active Transportation & Complete Streets, GE/FI - Green Economy & Freight Initiatives, REOF –Regional Economic Opportunity Fund; PD - Project Development, CONS - Construction, PLAN - Planning

(1) Foster Road total cost includes Phase I costs.

(2) NE 238th total cost includes ODOT Enhance project award for construction costs.

(3) Element of the Green Economy and Freight Initiatives that was inadvertently left off Exhibit A presented to TPAC on September 27, 2013.

		Portland				
Clackamas Coounty	Jennings Avenue: OR 99E to Oatfield Road Sidewalk and Bikelane Project	Clackamas Co	AT/CS	CONS	\$1,901,092	\$3,806,673
	SE 129th Avenue Bikelane and Sidewalks Project	Happy Valley	AT/CS	CONS	\$2,485,016	\$3,105,644
	Clackamas County Regional ITS Project - Phase 2B	Clackamas Co	GE/FI	CONS	\$1,230,000	\$1,370,799
	Trolley Trail Historic Bridge Feasibility Study: Gladstone to Oregon City	Gladstone	AT/CS	PLAN	\$201,892	\$235,000
	Sunrise System: Industrial Area Freight Access and Multimodal Project	Clackamas Co	REOF	CONS	\$8,267,000	\$8,268,563
				Sub-total:	\$68,018,000	\$128,605,296
Region-wide programs						
Transit Oriented Development					\$9,190,000	N/A
High Capacity Transit					\$48,000,000	N/A
Transportation System Management & Operations					\$4,640,000	N/A
Regional Travel Options					\$7,010,000	N/A
Corridor & Systems Planning					\$1,540,000	N/A
Regional Planning					\$3,630,000	N/A
Regional Freight Analysis and Project Development ⁽³⁾					\$500,000	N/A
				Sub-total:	\$74,510,000	N/A
				Grand Total:	\$142,528,000	

Notes: AT/CS - Active Transportation & Complete Streets, GE/FI - Green Economy & Freight Initiatives, REOF -Regional Economic Opportunity Fund; PD - Project Development, CONS - Construction, PLAN - Planning

(1) Foster Road total cost includes Phase I costs.

(2) NE 238th total cost includes ODOT Enhance project award for construction costs.

(3) Element of the Green Economy and Freight Initiatives that was inadvertently left off Exhibit A presented to TPAC on September 27, 2013.

BEFORE THE METRO COUNCIL

FOR THE PURPOSE OF ADOPTING THE) RESOLUTION NO. 14-4514
FISCAL YEAR 2013-15 UNIFIED PLANNING)
WORK PROGRAM AND CERTIFYING THAT) Introduced by Chief Operating Officer Martha
THE PORTLAND METROPOLITAN AREA IS IN) Bennett with the concurrence of Council
COMPLIANCE WITH THE FEDERAL) President Tom Hughes
TRANSPORTATION PLANNING
REQUIREMENTS

WHEREAS, the Unified Planning Work Program (UPWP) update as shown in Exhibit A attached hereto, describes all Federally-funded transportation planning activities for the Portland-Vancouver metropolitan area to be conducted in FY 2013-15; and

WHEREAS, the FY 2013-15 UPWP indicates Federal funding sources for transportation planning activities carried out by Metro, Southwest Washington Regional Transportation Council, Clackamas County and its cities, Multnomah County and its cities, Washington County and its cities, TriMet, and the Oregon Department of Transportation; and

WHEREAS, approval of the FY 2013-15 UPWP is required to receive Federal transportation planning funds; and

WHEREAS, JPACT and Metro Council approved the 2013-15 UPWP in May of 2013 as a two year work plan and stipulated an update in 2014; and

WHEREAS, this resolution amends the FY 2013-15 UPWP including three new projects:

1. N/NE Quadrant & I-5 Broadway/Weidler Additional Analysis
2. Regional Intelligent Transportation Systems (ITS) Communications Master Plan
3. Regional Intelligent Transportation Systems (ITS) Architecture Update; and

WHEREAS, the FY 2013-15 UPWP is consistent with the proposed Metro Budget submitted to the Metro Council; and

WHEREAS, the federal self-certification findings in Exhibit B demonstrate Metro's compliance with Federal planning regulations as required to receive Federal transportation planning funds; now therefore

BE IT RESOLVED by the Metro Council:

1. That the FY 2013-15 UPWP attached hereto as Exhibit A is hereby adopted.
2. That the FY 2013-15 UPWP is consistent with the continuing, cooperative, and comprehensive planning process and is given positive Intergovernmental Project Review action.
3. That Metro's Chief Operating Officer is authorized to apply for, accept, and execute grants and agreements specified in the UPWP.

4. That staff shall update the UPWP budget figures, as necessary, to reflect the final Metro budget.
5. That staff shall submit the final UPWP and self-certification findings to the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA).

ADOPTED by the Metro Council this _____ day of May 2014.

Tom Hughes, Council President

Approved as to Form:

Alison R. Kean, Metro Attorney

STAFF REPORT

IN CONSIDERATION OF RESOLUTION NO. 14-4514, FOR THE PURPOSE OF CERTIFYING THAT THE PORTLAND METROPOLITAN AREA IS IN COMPLIANCE WITH FEDERAL TRANSPORTATION PLANNING REQUIREMENTS AND ADOPTING THE FISCAL YEAR 2013-15 UNIFIED PLANNING WORK PROGRAM

Date: March 19, 2014

Prepared by: Chris Myers
(503) 813-7554

BACKGROUND

The Unified Planning Work Program (UPWP) is developed annually by Metro as the Metropolitan Planning Organization (MPO) for the Portland Metropolitan Area. It is a federally-required document that serves as a guide for transportation planning activities to be conducted over the course of each fiscal year, beginning on July 1st. Included in the UPWP are detailed descriptions of the transportation planning tasks, listings of various activities, and a summary of the amount and source of state and federal funds to be used for planning activities. The UPWP is developed by Metro with input from local governments, TriMet, ODOT, FHWA, and FTA.

Every four years, Metro as the MPO, undergoes certification review with (Federal Transit Administration [FTA] and Federal Highway Administration [FHWA]) to ensure compliance with federal transportation planning requirements. The next quadrennial certification review will take place in 2016. In the intervening years Metro undergoes a required self-certification process, with the FHWA and FTA, to ensure Metro's planning process is in compliance with certain Federal requirements as a prerequisite to receiving Federal funds.

The self-certification documents that we have met those requirements and is considered yearly at the time of Unified Planning Work Program (UPWP) approval. Required self-certification areas include:

- Metropolitan Planning Organization (MPO) designation
- Geographic scope
- Agreements
- Responsibilities, cooperation and coordination
- Metropolitan Transportation Planning products
- Planning factors
- Public Involvement
- Title VI
- Environmental Justice
- Disadvantaged Business Enterprise (DBE)
- Americans with Disabilities Act (ADA)
- Affirmative Action
- Construction Contracts
- Lobbying

Each of these areas is discussed in Exhibit A to Resolution No. ## - #####.

ANALYSIS/INFORMATION

1. **Known Opposition** – No known opposition

2. **Legal Antecedents** – this resolution certifies that the Portland metropolitan area is in compliance with Federal transportation planning requirements as defined in Title 23 of the Code of Federal Regulations, Parts 450 and 500, and title 49, of the Code of Federal Regulations, Part 613.
3. **Anticipated Effects** – Approval will mean that grants can be submitted and contracts executed so work can commence on July 1, 2014, in accordance with established Metro priorities.
4. **Budget Impacts** – Approval of this resolution is a companion to the UPWP. It is a prerequisite to receipt of Federal planning funds and is, therefore, critical to the Metro budget. The UPWP matches projects and studies reflected in the proposed Metro budget submitted by the Metro Chief Operating Officer to the Metro Council. The UPWP is subject to revision in the final adopted Metro budget.

RECOMMENDED ACTION

Approve Resolution No. ## - #### certifying that the Portland metropolitan area is in compliance with Federal transportation planning requirements.

Metro Self-Certification

1. Metropolitan Planning Organization Designation

Metro is the Metropolitan Planning Organization (MPO) designated by the Governor for the urbanized areas of Clackamas, Multnomah and Washington Counties, and operates in accordance with 23 U.S.C. 134 and 49 U.S.C. 5303.

Metro is a regional government with six directly elected district councilors and a regionally elected Council President. Local elected officials of general purpose governments are directly involved in the transportation planning/decision process through the Joint Policy Advisory Committee on Transportation (JPACT). JPACT provides the “forum for cooperative decision-making by principal elected officials of general purpose governments” as required by USDOT and takes action on the Regional Transportation Plan (RTP), the Metropolitan Transportation Improvement Program (MTIP) and the Unified Planning Work Program (UPWP). The Metro Policy Advisory Committee (MPAC) deals with non-transportation-related matters and with the adoption and amendment to the Regional Transportation Plan (RTP). Specific roles and responsibilities of the committees are described on page 2.

2. Geographic Scope

Transportation planning in the Metro region includes the entire area within the Federal-Aid Urban Boundary (FAUB). Metro updated the FAUB and Federal functional classification in January 2005 as recommended in Metro’s 2004 Federal Review. Additionally, as part of the 2035 RTP adopted in June 2010, the Metropolitan planning area boundaries were expanded to reflect the urbanized area defined by the 2000 Census to address a corrective action from the 2008 federal certification review. Work is currently underway to expand the Metropolitan planning area boundary to reflect the urbanized area defined by the 2010 Census and will be completed by December 2013.

3. Agreements

- a. A Memorandum of Agreement between Metro and the Southwest Washington Regional Transportation Council (RTC) delineates areas of responsibility and coordination. Executed in April 2012, the Agreement will be updated in April 2015.
- b. In accordance with 23 CFR 450.314, an intergovernmental agreement (IGA) between TriMet, Oregon Department of Transportation (ODOT), and Metro was executed in July 2008, to be updated in June 2018.
- c. Yearly agreements are executed between Metro and ODOT defining the terms and use of FHWA planning funds.
- d. A Memorandum of Understanding between Metro and the Department of Environmental Quality (DEQ) describing each agency’s responsibilities and roles for air quality planning. Executed in August 2010, it will not need to be updated until August 2013.
- e. A Memorandum of Understanding between Metro and South Metro Area Regional Transit (SMART) outlining roles and responsibilities for implementing the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was updated in 2011 and is effective July 1, 2011, and will be updated in June 2014. It will be updated to reflect the changes from Moving Ahead for Progress in the 21st Century (MAP-21) federal legislation that was signed into law in July 2012.

4. Responsibilities, Cooperation and Coordination

Metro uses a decision-making structure that provides state, regional, and local governments the opportunity to participate in the transportation and land use decisions of the organization. The two key committees are JPACT and MPAC. These committees receive recommendations from the Transportation Policy Alternatives Committee (TPAC) and the Metro Technical Advisory Committee (MTAC).

JPACT

This committee is comprised of three Metro Councilors; seven locally elected officials representing cities and counties, and appointed officials from ODOT, TriMet, the Port of Portland, and DEQ. The State of Washington is also represented with three seats that are traditionally filled by two locally elected officials and an appointed official from the Washington Department of Transportation (WSDOT). All transportation-related actions (including Federal MPO actions) are recommended by JPACT to the Metro Council. The Metro Council can approve the recommendations or refer them back to JPACT with a specific concern for reconsideration. Final approval of each item, therefore, requires the concurrence of both bodies. As recommended by Metro's 2004 Federal Review, JPACT has designated a Finance Subcommittee to explore transportation funding and finance issues in detail, and make recommendations to the full committee. In FY 2007-08, JPACT completed the bylaw review recommended in Metro's 2004 Federal Review and clarified representation of South Metro Area Regional Transit representation on the committee.

MPAC

This committee was established by the Metro Charter to provide a vehicle for local government involvement in Metro's planning activities. It includes eleven local elected officials, three appointed officials representing special districts, TriMet, a representative of school districts, three citizens, two non-voting Metro Councilors, two Clark County, Washington representatives and a non-voting appointed official from the State of Oregon. Under the Metro Charter, this committee has responsibility for recommending to the Metro Council adoption of or amendment to any element of the Charter-required RTP.

The Regional Framework Plan was adopted on December 11, 1997 and updated December 2005 and most recently in December 2010 and addresses the following topics:

- Transportation
- Land use (including the Metro Urban Growth Boundary (UGB))
- Nature in Neighborhoods
- Water supply and watershed management
- Natural hazards
- Coordination with Clark County, Washington
- Management and implementation

As part of the 2035 RTP adoptions there were specific changes made to the Regional Transportation Functional Plan. In accordance with this requirement, the transportation component of the Regional Framework Plan developed to meet Federal transportation planning regulations, the Oregon Transportation Planning Rule and Metro Charter requirements that require a recommendation from both MPAC and JPACT. This ensures integration of transportation with land use and environmental concerns.

5. Metropolitan Transportation Planning Products

a. Unified Planning Work Program

JPACT, the Metro Council, and the Southwest Washington RTC adopt the UPWP annually. It fully describes work projects planned for the Transportation Department during the fiscal year and is the basis for grant and funding applications. The UPWP also includes federally funded major projects being planned by member jurisdictions. These projects will be administered by Metro through intergovernmental agreements with ODOT and the sponsoring jurisdiction. As required by Metro's 2012 Federal Review, Congestion Management Process (CMP) and RTP update tasks were expanded in the UPWP narratives. The CMP was adopted as part of the 2035 RTP and can be found in Appendix 4.4. Also, Metro identified environmental justice tasks in the UPWP in the Environmental Justice and Title VI narrative and individual program narratives; elderly and disabled planning tasks have been identified in the Regional Transportation Plan program narrative.

b. Regional Transportation Plan

JPACT and the Metro Council approved the 2035 RTP in June 2010. The 2035 RTP includes a new policy for the purpose of transportation planning and project funding to address SAFETEA-LU provisions and key issues facing the region. The 2035 RTP establishes a new outcomes-based framework and new policies and tools to guide future planning and investment decisions. The plan includes a broad set of ambitious performance targets that are tied to the outcomes that the RTP is trying achieve. The targets and other performance measures included in the plan continue the region's shift away from reliance upon level-of-service as the primary measure for determining transportation needs and success of the plan's strategies. To successfully implement this new approach and make progress toward the six desired outcomes identified through the *Making the Greatest Place* effort, new actions, tools and collaboration are needed.

Finally, the 2035 RTP has three new system component plans: a Regional Transportation System Management and Operations Plan, a Regional Freight Plan and a Regional High Capacity Transit System Plan. These plans more fully articulate the integrated multi-modal regional transportation system and prioritize investments to improve the operations and efficiency of the existing transportation, improve freight reliability and strategically expand the HCT system to support 2040 Growth Concept implementation and meet other goals of the RTP. In addition, the Regional Transportation Functional Plan (RTFP) component of the RTP directs how local governments will implement the RTP.

As required by Metro's 2008 Federal Review, the 2035 update included documentation of the process for both full and administrative RTP amendments. A Regional Safety Workgroup was also formed in October 2009 to better address safety as part of Metro's planning process. The Safety Workgroup completed the Regional Transportation Safety Plan in May 2012. However, due to a lack of funding coordination of safety activities will continue on a limited basis as part of corridor planning activities and the Regional Mobility Program.

A new map was added to Chapter 1 of the RTP that identifies the MPO Planning Boundary and the Air Quality Maintenance Area Boundary. This boundary defines the area that the RTP applies to for Federal planning purposes. The boundary includes the area inside Metro's jurisdictional boundary, the 2008 UGB and the 2000 census defined urbanized area boundary for the Portland metropolitan region. Work is currently underway to update the boundary to reflect the 2010 census defined urbanized area boundary.

FHWA and FTA approved the 2035 RTP and the associated air quality conformity determination on February 29, 2008 and again in September 2010. Documentation of compliance with specific Federal planning requirements is summarized in subsequent sections of this document.

Work will begin in fiscal years 2013-15 to complete the 2014 RTP update.

c. Metropolitan Transportation Improvement Program

The MTIP update was adopted in March 2012 and incorporated into the 2012-15 State Transportation Improvement Program (STIP). The update included the allocation of \$71 million of Surface Transportation Program (STP) and Congestion Mitigation/Air Quality Program (CMAQ) funding, programming of projects for the ODOT Modernization, Bridge, Safety, Preservation, Operations, OTIA III, Enhancements, and Immediate Opportunity Fund projects and programming of transit funding. The first year of programming is considered the priority project funding for the region. Should any of these projects be delayed, projects of equivalent dollar value may be advanced from the second, third or fourth years of the program without processing formal Transportation Improvement Program (TIP) amendments. As recommended in Metro's 2004 Federal Review, the MTIP webpage was linked to ODOT's STIP page.

Work is currently underway to develop the 2015-18 MTIP. An adopted list of priority projects for regional flexible funds is expected in October 2013.

6. Planning Factors

Currently, Metro's planning process addresses the MAP-21 planning factors in all projects and policies. Table 1 below describes the relationship of the planning factors to Metro's activities and Table 2 outlines Metro's response to how the factors have been incorporated into the planning process. The MAP-21 planning factors are:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase the accessibility and mobility options available to people and for freight;
5. Protect and enhance the environment, promote energy conservation and improve quality of life;
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
7. Promote efficient management and operations; and
8. Emphasize the preservation of the existing transportation system.

As noted in Tables 1 and 2, Metro has reviewed and updated both the RTP and MTIP, and revised both documents to be compliant with MAP-21 planning requirements.

Table 1: MAP-21 Planning Factors

Factor	System Planning (RTP)	Funding Strategy (MTIP)	High Capacity Transit (HCT)
1. Support Economic Vitality	<ul style="list-style-type: none"> • RTP policies linked to land use strategies that promote economic development. • Industrial areas and intermodal facilities identified in policies as "primary" areas of focus for planned improvements. • Comprehensive, multimodal freight improvements that link intermodal facilities to industry are detailed for the plan period. • Highway Level of Service (LOS) policy tailored to protect key freight corridors. • RTP recognizes need for freight linkages to destinations beyond the region by all modes. 	<ul style="list-style-type: none"> • All projects subject to consistency with RTP policies on economic development and promotion of "primary" land use element of 2040 development such as centers, industrial areas and intermodal facilities. • Special category for freight improvements calls out the unique importance for these projects. • All freight projects subject to funding criteria that promote industrial jobs and businesses in the "traded sector." 	<ul style="list-style-type: none"> • HCT plans designed to support continued development of regional centers and central city by increasing transit accessibility to these locations. • HCT improvements in major commute corridors lessen need for major capacity improvements in these locations, allowing for freight improvements in other corridors.

Table 1: MAP-21 Planning Factors

Factor	System Planning (RTP)	Funding Strategy (MTIP)	High Capacity Transit (HCT)
2. Increase Safety	<ul style="list-style-type: none"> • The RTP policies call out safety as a primary focus for improvements to the system. • Safety is identified as one of three implementation priorities for all modal systems (along 	<ul style="list-style-type: none"> • All projects ranked according to specific safety criteria. • Road modernization and reconstruction projects are scored according to 	<ul style="list-style-type: none"> • Station area planning for proposed HCT improvements is primarily driven by pedestrian access and safety considerations.

Table 1: MAP-21 Planning Factors

Factor	System Planning (RTP)	Funding Strategy (MTIP)	High Capacity Transit (HCT)
	<p>with preservation of the system and implementation of the region's 2040-growth management strategy).</p> <ul style="list-style-type: none"> • The Regional Safety Workgroup completed a safety plan for the Portland Metropolitan region in May 2012. Recommendations will continue to be implemented in 2013-2015 as resources become available. • The RTP includes a number of investments and actions aimed at further improving safety in the region, including: <ul style="list-style-type: none"> ◦ Investments targeted to address known safety deficiencies and high-crash locations. ◦ Completing gaps in regional bicycle and pedestrian systems. ◦ Retrofits of existing streets in downtowns and along main streets to include on-street parking, street trees marked street crossings and other designs to slow traffic speeds to follow posted speed limits. ◦ Intersection changes and ITS strategies, including signal timing and real-time traveler information on road conditions and hazards. ◦ Expanding safety education, awareness and multi-modal data collection efforts at all levels of government. ◦ Expand safety data collection efforts and create a better system for centralized crash data for all modes of travel. 	<p>relative accident incidence.</p> <ul style="list-style-type: none"> • All projects must be consistent with regional street design guidelines that provide safe designs for all modes of travel. 	

Table 1: MAP-21 Planning Factors

Factor	System Planning (RTP)	Funding Strategy (MTIP)	High Capacity Transit (HCT)
3. Increase Security	<ul style="list-style-type: none"> • System security was incorporated into the 2035 RTP. • Security and emergency management activities are summarized in Section 1.6 of the 2035 RTP (Pages 1-38 – 1-40). • Policy framework in Section 2.3 of the 2035 RTP includes, “Goal 5: Enhance Safety and Security,” and specific security objectives and potential actions to increase security of the transportation system for all users. • Includes investments that increase system monitoring for operations, management and security of the regional mobility corridor system. • Actions direct Metro to work with local, state and regional agencies to identify critical infrastructure in the region, assess security vulnerabilities and develop coordinated emergency response and evacuation plans. • Actions direct transportation providers to monitor the regional transportation and minimize security risks at airports, transit facilities, marine terminals and other critical infrastructure. 		<ul style="list-style-type: none"> • System security has been a routine element of the HCT program, and does not represent a substantial change to current practice.

Table 1: MAP-21 Planning Factors

Factor	System Planning (RTP)	Funding Strategy (MTIP)	High Capacity Transit (HCT)
4. Increase Accessibility	<ul style="list-style-type: none"> • The RTP policies are organized on the principle of providing accessibility to centers and employment areas with a balanced, multi-modal transportation system. • The policies also identify the need for freight mobility in key freight corridors and to provide freight access to industrial areas and intermodal facilities. • The plan emphasizes accessibility and reliability of the system, particularly for commuting and freight, and includes a new, more customized approach to managing and evaluating performance of mobility corridors. This new approach builds on using new, cost-effective technologies to improve safety, optimize the existing system, and ensure freight transporters and commuters have a broad range of travel options in each corridor. 	<ul style="list-style-type: none"> • Measurable increases in accessibility to priority land use elements of the 2040-growth concept is a criterion for all projects. • The MTIP program places a heavy emphasis on non-auto modes in an effort to improve multi-modal accessibility in the region. 	<ul style="list-style-type: none"> • The planned HCT improvements in the region will provide increased accessibility to the most congested corridors and centers. • Planned HCT improvements provide mobility options to persons traditionally underserved by the transportation system.

Table 1: MAP-21 Planning Factors (continued)

Factor	System Planning (RTP)	Funding Strategy (MTIP)	High Capacity Transit (HCT)
<p>5. Protect Environment and Quality of Life</p>	<ul style="list-style-type: none"> • The RTP is constructed as a transportation strategy for implementing the region's 2040-growth concept. The growth concept is a long-term vision for retaining the region's livability through managed growth. • The RTP system has been "sized" to minimize the impact on the built and natural environment. • The region has developed an environmental street design guidebook to facilitate environmentally sound transportation improvements in sensitive areas, and to coordinate transportation project development with regional strategies to protect endangered species. • The RTP conforms to the Clean Air Act. • Many new transit, bicycle, pedestrian and Transportation Demand Management (TDM) projects have been added to the plan to provide a more balanced multi-modal system that maintains livability. • RTP transit, bicycle, pedestrian and TDM projects will complement the compact urban form envisioned in the 2040 growth concept by promoting an energy-efficient transportation system. • Metro coordinates its system level planning with resource agencies to identify and resolve key issues. • The region's parking policies (Title 4 of the Regional Transportation Functional Plan) are also designed to encourage the use of alternative modes, and reduce reliance on the automobile, thus promoting energy conservation and reducing air quality impacts. 	<ul style="list-style-type: none"> • The MTIP conforms to the Clean Air Act and continues to comply with the air quality maintenance plan in accordance with sections 174 and 176 (c) and (d) of the Clean Air Act, as amended (42 U.S.C. 7504, 7605 (c) and (d)) and 40 CFR part 93. • The MTIP focuses on allocating funds for clean air (CMAQ), livability (Transportation Enhancement) and multi- and alternative modes (STIP). • Bridge projects in lieu of culverts have been funded through the MTIP to enhance endangered salmon and steelhead passage. • "Green Street" demonstration projects funded to employ new practices for mitigating the effects of storm water runoff. 	<ul style="list-style-type: none"> • HCT improvements provide emission-free transportation alternatives to the automobile in some of the region's most congested corridors and centers. • HCT transportation alternatives enhance quality of life for residents by providing an alternative to auto travel in congested corridors and centers.

Table 1: MAP-21 Planning Factors (continued)

Factor	System Planning (RTP)	Funding Strategy (MTIP)	High Capacity Transit (HCT)
6. System Integration/ Connectivity	<ul style="list-style-type: none"> • The RTP includes a functional classification system for all modes that establishes an integrated modal hierarchy. • The RTP policies and Functional Plan include a street design element that integrates transportation modes in relation to land use for regional facilities. • The RTP policies and Functional Plan include connectivity provisions that will increase local and major street connectivity. • The RTP freight policies and projects address the intermodal connectivity needs at major freight terminals in the region. • The intermodal management system identifies key intermodal links in the region. 	<ul style="list-style-type: none"> • Projects funded through the MTIP must be consistent with regional street design guidelines. • Freight improvements are evaluated according to potential conflicts with other modes. 	<ul style="list-style-type: none"> • Planned HCT improvements are closely integrated with other modes, including pedestrian and bicycle access plans for station areas and park-and-ride and passenger drop-off facilities at major stations.
7. Efficient Management & Operations	<ul style="list-style-type: none"> • The policy component of the 2035 RTP includes specific provisions for efficient system management and operation (2035 RTP Goal 4), with an emphasis on TSM, ATMS and the use of non-auto modal targets (Table 2.5) to optimize the existing and planned transportation system. • The 2035 RTP included adoption of the Regional Transportation System Management and Operations (TSMO) Plan. The TSMO Plan includes project and corridor prioritization. • Proposed RTP projects include many system management improvements along regional corridors. • The plan also calls for consideration of value pricing in the region to better manage capacity and peak use of the throughway system. However, more work is needed to gain 	<ul style="list-style-type: none"> • Projects are scored according to relative cost effectiveness (measured as a factor of total project cost compared to measurable project benefits). • TDM projects are solicited in a special category to promote improvements or programs that reduce single occupancy vehicle (SOV) pressure on congested corridors. • TSM/ITS projects are funded through the MTIP. 	<ul style="list-style-type: none"> • Proposed HCT improvements include redesigned feeder bus systems that take advantage of new HCT capacity and reduce the number of redundant transit lines.

Table 1: MAP-21 Planning Factors (continued)

Factor	System Planning (RTP)	Funding Strategy (MTIP)	High Capacity Transit (HCT)
	public acceptance of this tool.		

7. Public Involvement

Metro maintains a proactive public involvement process that provides complete information, timely public notice, and full public access to key decisions. Metro supports early and continuing involvement of the public in developing its policies, plans and programs. Public Engagement Plans are designed to both support the technical scope and objectives of Metro studies and programs while simultaneously providing for innovative, effective and inclusive opportunities for engagement. Every effort is made to employ broad and diverse methods, tools and activities to reach potentially impacted communities and other neighborhoods, and to encourage the participation of low-income and minority residents and organizations.

In November 2013, Metro Council adopted an updated Public Engagement Guide (formerly the Public Involvement Policy for Transportation Planning) and submitted it to Federal Highway Administration and Federal Transit Administration in compliance with 23 CFR 450.316(a) and FTA C 4702.1B. The guide reflects changes in the Moving Ahead for Progress in the 21st Century Act (MAP-21), and was adopted after considering comments received during a 45-day comment period on the guide.

All Metro UPWP studies and projects that have a public involvement component require a Public Engagement Plan (PEP) that follows the agency's Public Engagement Guide with input from Metro's advisory committees, including Metro's Public Engagement Review Committee. Included in individualized PIPs are strategies and methods to best involve a diverse constituency. Some of these may include special public opinion survey mechanisms, translation of materials for non-English speaking members of the community, citizen working committees or advisory committee structures, special task forces, web instruments and a broad array of public information materials. Hearings, workshops, open houses, charrettes and other activities are also held as needed. Since the Public Engagement Guide was developed, in large part, based on internal best practices, projects that began or completed their public involvement component prior to the adoption of the guide, such as the Southwest Corridor Plan Phase I and the East Metro Connections Plan, comply with the engagement practices outlined in the guide.

A combined strategy will engage the public on the 2014 RTP update, the 2015-18 MTIP and decisions for Climate Smart Communities. The work program and PEP for this combined engagement was developed with input from Metro's Advisory Committees, including Metro's Public Engagement Review Committee. The engagement strategy includes community forums, informal

and formal input opportunities as well as a 45-day+ comment period for the community, affected public agencies, representatives of transportation agency employees, freight shippers, providers of freight transportation services, private providers of transportation, representatives of users of public transit, and other interested persons. Public involvement opportunities will be published in community newspapers, posted on Metro's web site, emailed via the Planning Department E-News to more than 4,500 individuals, and emailed to Metro's OptIn opinion panel. All plan documents will be published on the Metro website, including draft plan amendments, the update schedule, other explanatory materials and summaries of public comments received.

Title VI – In May 2012, FTA approved Metro's Title VI Program, which also includes a revised Limited English Proficiency Plan. This plan is now being implemented through updates to Metro's RTP and MTIP, and through corridor planning activities in the region. It includes both a non-discrimination policy and complaint procedure. On Aug. 30, 2013, Metro submitted a Title VI Compliance Report to ODOT, covering a 12 month period from July 1, 2012, through June 30, 2013. The next annual report will be due Aug. 30, 2014, covering July 1, 2013 to June 30, 2014. Early in public involvement processes, Metro analyzes the demographics of a program or project area for to begin engagement and begin to understand the potential concerns of minorities and people with limited English proficiency. This analysis informs the Public Engagement Plan for the program or project, each of which include sections addressing equitable outreach.

Environmental Justice – The intent of environmental justice (EJ) practices is to ensure the needs of minority and disadvantaged populations are considered and the relative benefits/impacts of individual projects on local communities are thoroughly assessed and vetted. Metro continues to expand and explore environmental justice efforts that provide early access to and consideration of planning and project development activities. Metro's EJ program is organized to communicate and seek input on project proposals and to carry those efforts into the analysis, community review and decision-making processes. In addition, Metro established an agency diversity action team. The team is responsible for identifying opportunities to collaboratively develop and implement sustainable diversity initiatives across and throughout the agency. Metro's diversity efforts are most evident in three areas: Contracts and Purchasing, Community Outreach, and Recruitment and Retention. Additionally, as part of Metro's Regional Flexible Fund Allocation (RFFA), a process Metro conducts every two years to distribute federal funding to regional programs and local projects, equity analysis and outreach was conducted. Over the years, Metro has worked to integrate equity considerations to a greater degree every cycle, with the 2016-18 allocation process being the strongest effort so far in ensuring that underserved populations are not only considered in the decision-making process, but that projects are developed around better meeting the needs of communities that have been traditionally underserved.

Efforts to develop an "equity lens" through which decisions are made in the region are ongoing, as are the challenges of applying this lens to everyday planning activities and analysis. This cycle of RFFA attempted to address equity by increasing our knowledge about underserved community transportation needs and access and where concentrations of communities in need are located. Local project applicants were provided this information to propose projects in areas that face the greatest transportation barriers in meeting daily needs of residents with the desired outcome of additional investment in areas of most need. Metro's increased focus on equity in this RFFA cycle reflects national and regional shifts in regulations and policies that emphasize the importance of increasing equity in our practices to better meet the needs of communities in the region and respond to shifting demographics.

Metro is developing new methodology to understand potential benefits and burdens of investments in the 2014 RTP and 2015-18 MTIP. A forum of community leaders addressing environmental justice issues will be held to further understand the data analysis. The technical findings and qualitative inquiry will be presented to Metro Advisory Committees and Metro Council as part of the decision-making processes for the plan and program.

8. Disadvantaged Business Enterprise

A revised Disadvantaged Business Enterprise (DBE) program was adopted by the Metro Council in June 1997 (Ordinance No. 97-692A).

Metro's DBE program was reviewed and submitted to FTA in August 1999. Metro currently piggybacks on ODOT's DBE program.

9. Americans with Disabilities Act

The Americans with Disabilities Act (ADA) Joint Complementary Paratransit Plan was adopted by the TriMet Board in December 1991 and was certified as compatible with the RTP by Metro Council in January 1992. The plan was phased in over five years and TriMet has been in compliance since January 1997. Metro approved the 1997 plan as in conformance with the RTP. FTA audited and approved the plan in summer 1999. The Special Transportation Funding Advisory Committee, staffed by TriMet, coordinated with Metro as the MPO in updating the Coordinated Human Services Transportation Plan adopted in June 2009. An update was completed in October 2012 (<http://trimet.org/pdfs/publications/elderly-and-disabled-plan.pdf>).

10. Affirmative Action

In accordance with 49 U.S.C. 5331, 42 U.S.C. 6101, Section 324 of title 23 U.S.C. and Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and 49 CFR part 27, Metro states as its policy a commitment to provide equal employment opportunities without regard to race, color, religion, national origin, sex, age, disability, sexual orientation, or marital or familial status, except where a bona fide occupational qualification exists. Compliance with this policy is administered by Metro's Human Resources Department.

11. Construction Contracts

Provisions of 23 CFR part 230 do not apply to Metro as Metro does not administer Federal and Federal-aid highway construction contracts.

12. Lobbying

Annually Metro certifies compliance with 49 CFR 20 through the FTA TEAM system.

Table 2: Metro’s Response to MAP-21 Provisions

MAP-21 Provision for all MPOs	Metro Response
<p><i>Consult/Coordinate with planning officials responsible for planned growth, economic development, environmental protection, airport operations, and freight movement.</i></p>	<p>Metro’s transportation planning and land-use planning functions are within the same department and coordinate internally.</p> <ul style="list-style-type: none"> • Metro facilitates this consultation, coordination and decision-making through four advisory committee bodies –the Joint Policy Advisory Committee on Transportation (JPACT), the Metro Policy Advisory Committee (MPAC), the Transportation Policy Alternatives Committee (TPAC) and the Metro Technical Advisory Committee (MTAC). Metro consults MPAC on land-use activities. • Metro is a member of Regional Partners for Economic Development and endorsed the Consolidated Economic Development Strategy (CEDS). • Metro has implemented a fish and wildlife habit protection program through regulations, property acquisition, education and incentives. • Metro has a standing committee to coordinate with public agencies with environmental protection responsibility. • The Port of Portland manages the airport and marine terminal, and is represented on both TPAC and JPACT. • Metro also coordinated with freight, rail, airport operations and business interests through the Regional Freight and Goods Movement Task Force and Regional Freight and Goods Movement Technical Advisory Committee in developing a Regional Freight Plan. The Regional Freight Plan was adopted as part of the 2035 RTP in June 2010.
<p><i>Promote consistency between transportation improvements and State and local planned growth and economic development.</i></p>	<p>Metro transportation and land-use planning is subject to approval by the Oregon Department of Land Conservation and Development.</p>
<p><i>Give safety and security due emphasis as separate planning factors.</i></p>	<p>Metro addressed security and safety as individual factors in the update to the RTP in 2010.</p> <ul style="list-style-type: none"> • Separate background research papers were developed during Phase 2 of the update to document current safety issues and planning efforts, and current security planning efforts in the region. This research is included Appendix 7.0 was considered during the formulation of the 2035 RTP goals, objectives, projects and potential actions included in Chapter 2 and investment priorities in Chapter 3 of the 2035 RTP. <p>Additionally, Metro staffs the Regional Emergency Management Group (REMG), which has expanded its scope to include anti-terrorism preparedness, TriMet’s responsibility for transit security plans, ODOT’s responsibility for coordination of state security plans, Port of Portland’s responsibility for air, marine and other Port facilities security plans and implementation of system management strategies to improve security of the transportation system (e.g., security cameras on MAX and at transit stations). The group brings together local emergency managers to plan responses to security concerns and natural hazards.</p>

	<p>Metro convened a Regional Safety Workgroup to better address safety in the MPO planning process. The Safety Workgroup completed a safety plan for the Portland Metropolitan region May 2012. Implementation will begin in fiscal years 2013-15 as resources become available.</p>
--	--

Table 2: Metro’s Response to MAP-21 Provisions (continued)

MAP-21 Provision for all MPOs	Metro Response
<p><i>Discuss in the transportation plan potential environmental mitigation activities to be developed in consultation with Federal, State, and tribal wildlife, land management, and regulatory agencies.</i></p>	<p>SAFETEA-LU provisions for additional consultation with state and Federal resource agencies, and tribal groups that were not already part of Metro’s existing committee structure were met through a consultation meeting held on October 16, 2007 with the Collaborative Environmental Transportation Agreement for Streamlining (CETAS) work group, consisting of the Oregon Department of Transportation and ten state and Federal transportation, natural resource, cultural resource and land-use planning agencies. A background research paper was also developed during Phase 2 of the update to document current environmental trends, issues and current mitigation strategies in the region. This research was considered during the formulation of the 2035 RTP goals, objectives, projects and potential actions included in Chapter 2 and investment priorities in Chapter 3 of the 2035 RTP. In addition, staff conducted an analysis of the potential environmental effects of transportation investments. The background research report and environmental considerations analysis is included in Appendix 7.0.</p>
<p><i>Consult with State and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation in development of the transportation plan.</i></p>	<p>SAFETEA-LU provisions for additional consultation with state and Federal resource agencies, and tribal groups that were not already part of Metro’s existing committee structure were met through a consultation meeting held on October 16, 2007 with the Collaborative Environmental Transportation Agreement for Streamlining (CETAS) work group, consisting of the Oregon Department of Transportation and ten state and Federal transportation, natural resource, historic, cultural resource and land-use planning agencies.</p> <p>A background research paper was also developed during Phase 2 of the update to document current environmental trends, issues and mitigation strategies in the region. This research was considered during the formulation of the 2035 RTP goals, objectives, projects and potential actions included in Chapter 2 and investment priorities in Chapter 3 of the 2035 RTP. In addition, staff conducted an analysis of the potential environmental effects of transportation investments – this analysis included a comparison of the RTP investments with available State Conservation maps and inventories of historic resources. The background research report and environmental considerations analysis is included in Appendix 7.0.</p>

Table 2: Metro's Response to MAP-21 Provisions (continued)

MAP-21 Provision for all MPOs	Metro Response
<p><i>Include operation and management strategies to address congestion, safety, and mobility in the transportation plan.</i></p>	<ul style="list-style-type: none"> • System management policies in the RTP (2035 RTP Section 3.4.4) and resulting projects and programs are intended to maximize the use of existing facilities to address congestion, safety and mobility. • The Transportation System Management and Operations (TSMO) Plan was adopted as part of the 2035 RTP in June 2010. The TSMO Plan guides the region's continued investment in operation, management and data collection to invest efficiently in transportation. • The regional CMP also requires local jurisdictions to explore system management solutions before adding roadway capacity to the regional system. The key framework for the CMP was the Mobility Corridors identified as part of the 2035 RTP development. Chapter 4 of the 2035 RTP lays out specific strategies for each mobility corridor for addressing the goals and policies of the RTP. The CMP can be found in Appendix 4.4 of the 2035 RTP. • The plan also calls for consideration of value pricing in the region to better manage capacity and peak use of the throughway system. • RTP projects in Chapter 3 include many system management improvements along regional mobility corridors and the supporting arterial system. • Metro has established a Regional Transportation Options Committee as a subcommittee of TPAC to address demand management. The TransPort Committee is a subcommittee of TPAC to address ITS and operations. • Metro convened a Regional Safety Workgroup to better address safety in the MPO planning process. The Safety Workgroup completed a safety plan for the Portland Metropolitan region May 2012. Implementation will begin in fiscal years 2013-15 as resources become available.

Table 2: Metro’s Response to MAP-21 Provisions (continued)

MAP-21 Provision for all MPOs	Metro Response
<p><i>Develop a participation plan in consultation with interested parties that provides reasonable opportunities for all parties to comment on transportation plan.</i></p>	<p>Metro has public involvement policy for regional transportation planning and funding activities to support and encourage board-based public participation in development and review of Metro’s transportation plans. The Transportation Planning Public Involvement Policy was last updated in June 2009. An update is currently underway and will be completed by December 2013.</p> <p>The work program and public participation plan (PPP) for the 2035 RTP update was developed with input from Metro’s Advisory Committees, including Metro’s Committee for Citizen Involvement.</p> <p>Approval of the 2035 RTP, Ordinance No. 10-1241B, followed JPACT and Metro Council consideration of approximately 300 comments received during the public comment period. The comments were summarized into a comment log and Public Comment Summary Report. Refinements were recommended to respond to the comments received. The comment period for the Air Quality Conformity Determination provided an opportunity for public review and comment on the air quality conformity methodology and results.</p> <p><i>Appendix 4.3 in the 2035 RTP describes the public process in more detail.</i></p>
<p><i>Employ visualization techniques to describe plan and make information available (including transportation plans) to the public in electronically accessible format such as on the Web.</i></p>	<p>On a regular basis, Metro employs visualization techniques. Examples include:</p> <ul style="list-style-type: none"> • RTP document is available on Metro’s website • RTP newsletters and maps • MTIP document is available on Metro’s website • GIS maps to illustrate planning activities • Participation in FHWA GIS Web Training <p>Video simulation of light rail on the Portland Mall and I-205 Corridor.</p>
<p><i>Update the plan at least every 4 years in non-attainment and maintenance areas, 5 years in attainment areas.</i></p>	<p>2035 RTP update was completed on June 10, 2010. An update of the RTP is currently underway and will be completed by June 2014.</p>
<p><i>Update the TIP at least every 4 years, include 4 years of projects and strategies in the TIP.</i></p>	<p>Initiated MTIP and STIP update for spring 2012. Work is currently underway on the 2015-18 MTIP. It will be completed by October 2014.</p>
<p><i>SAFETEA-LU includes a new requirement for a “locally developed, coordinated public transit/human services transportation plan” to be eligible for formula funding under three FTA grant programs (5310,5316,5317) It is not clear yet who will be responsible for these plans.</i></p>	<p>Metro participates on the Special Transportation Fund Advisory Committee and Regional Transportation Coordinating Council of the Elderly and Disabled Transportation Plan. A coordinated human services and public transportation plan was developed by those committees and has been integrated into the 2010 RTP update. TriMet recently completed an update to the Elderly and Disable Transportation Plan in October 2012. Components of this will be incorporated into the 2014 RTP update.</p>

FY 2013-15

Unified Planning Work Program - Update

**Transportation Planning in the
Portland/Vancouver Metropolitan Area**

March 20, 2014

Draft

LINK TO DOCUMENT HERE



Date: April 2, 2014
To: Joint Policy Advisory Committee on Transportation and Interested Parties
From: Ted Leybold, Metropolitan Transportation Improvement Program Manager
Grace Cho, Assistant Transportation Planner
Subject: 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI Assessment – Scope of Analysis and Process Schedule

Purpose

To provide an understanding of the analysis, public comment and adoption process in preparation for possible constituent communications and adoption of the final report findings and recommendations (scheduled for JPACT and Council consideration in July).

Background

As a metropolitan planning organization, part of the region’s federal obligations requires Metro to conduct an Environmental Justice and Title VI assessment of the agency’s transportation planning and programming activities. Therefore, a component of the 2014 RTP update and the 2015-2018 MTIP is an investment analysis which assesses where transportation investments are being made relative to concentrations of five identified environmental justice communities.

JPACT will be presented the process and schedule for the analysis to prepare for the upcoming public comment period and subsequent consideration of the analysis report and recommendations. The input received during the public comment period is **intended to help shape findings** and recommendations for consideration by TPAC, JPACT, and the Metro Council. **Regional discussions will kick off** with a public comment period schedule for mid-May 2014.

The 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI Assessment fulfills federal requirements, but is also relevant to the work being conducted through Metro’s Equity Strategy. Transportation planning staff is coordinating with Metro Equity Strategy staff to identify areas where work may support both programs, but also proceeding to meet federal requirements for the RTP and MTIP as the regional equity strategy is finalized.

Contents and Framework of Assessment

The 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment is staged in three phases. The first phase involved determining the definitions, thresholds, and overall methodology for the assessment.

The second phase will illustrate the results of the methodology applied to the region’s short-term (via the 2015-2018 MTIP) and long-term (via the 2014 RTP) transportation investments. The analysis will examine where transportation investments are being proposed relative to concentrations of environmental justice communities within the region. The assessment uses benchmarks of transportation investment per person per acre to determine if there are disproportionate investments.

The third phase focuses on understanding the how the transportation investments proposed for the region in the short-term and the long-term affect environmental justice communities at a programmatic level.

Public Comment Period and Final Report

Survey results and comments at the TriMet community forums indicated that whether a transportation investment is perceived as a benefit or a burden to an individual persons or a community depends greatly on the context of each individual or community. This is why summary of the public comments about the short and long-term investment analysis and program is a critical component to the final report and its recommendations.

The following items related to the 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment are being prepared for the public comment period:

- Maps of transportation investments in the region for the 2014 RTP and the 2015-2018 MTIP
- Demographic maps showing where concentrations of environmental justice communities are located within the region.
- Summary of potential burdens and benefits associated with transportation investments.
- Summary of short and long-term transportation investments relative to environmental justice and Title VI communities with data findings.

The demographic maps of where concentrations of environmental justice communities are attached as information for JPACT members.

To understand the how the transportation investments proposed for the region in the short-term and the long-term affect environmental justice communities at a programmatic level the following questions will be asked:

- 1) What are the different positive and negative experiences environmental justice and Title VI communities experience with different transportation investments? (See Attachment A for a list of potential experiences)
- 2) At a programmatic scale, (not project-specific) what can the region do to help reduce disproportionate negative impacts on environmental justice communities and eliminate disparate impacts? Which can be implemented in the short-term? Which can be implemented and monitored over time?

The feedback will help gather a greater understanding of the positive and negative effects environmental justice communities may experience with transportation investments in the short and long-term. Based on the analysis and the feedback received through the public engagement process, findings and recommendations of regional strategies to address disproportionate burdens or disparate impacts will be developed for consideration by JPACT and the Metro Council.

Schedule

The following is the schedule of engagement to be conducted as part of the third phase of the assessment.





Activity	Date
Presentation of 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment method to TPAC	March 28, 2014
Focus group with environmental justice organizations to review assessment method	April 2, 2014
Presentation of 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment method to JPACT	April 10, 2014
Preview of results for the Draft 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment method with Metro Council	April 22, 2014
Presentation of 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment method to MTAC	May 7, 2014
Presentation of 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment method to MPAC	May 14, 2014




Release of Draft 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment for public comment	May 16, 2014
Close of Public Comment	June 15, 2014
Develop findings and recommendations for the 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment	June 2014
Presentation of findings and recommendations from the 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment with Metro Council	June 24, 2014
Presentation of findings and recommendations from the 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment with TPAC Recommendation	June 27, 2014
Presentation of findings and recommendations from the 2014 RTP and 2015-2018 MTIP Environmental Justice and Title VI assessment with JPACT Action	July 10, 2014
Metro Council Adoption by Resolution	July 17, 2014

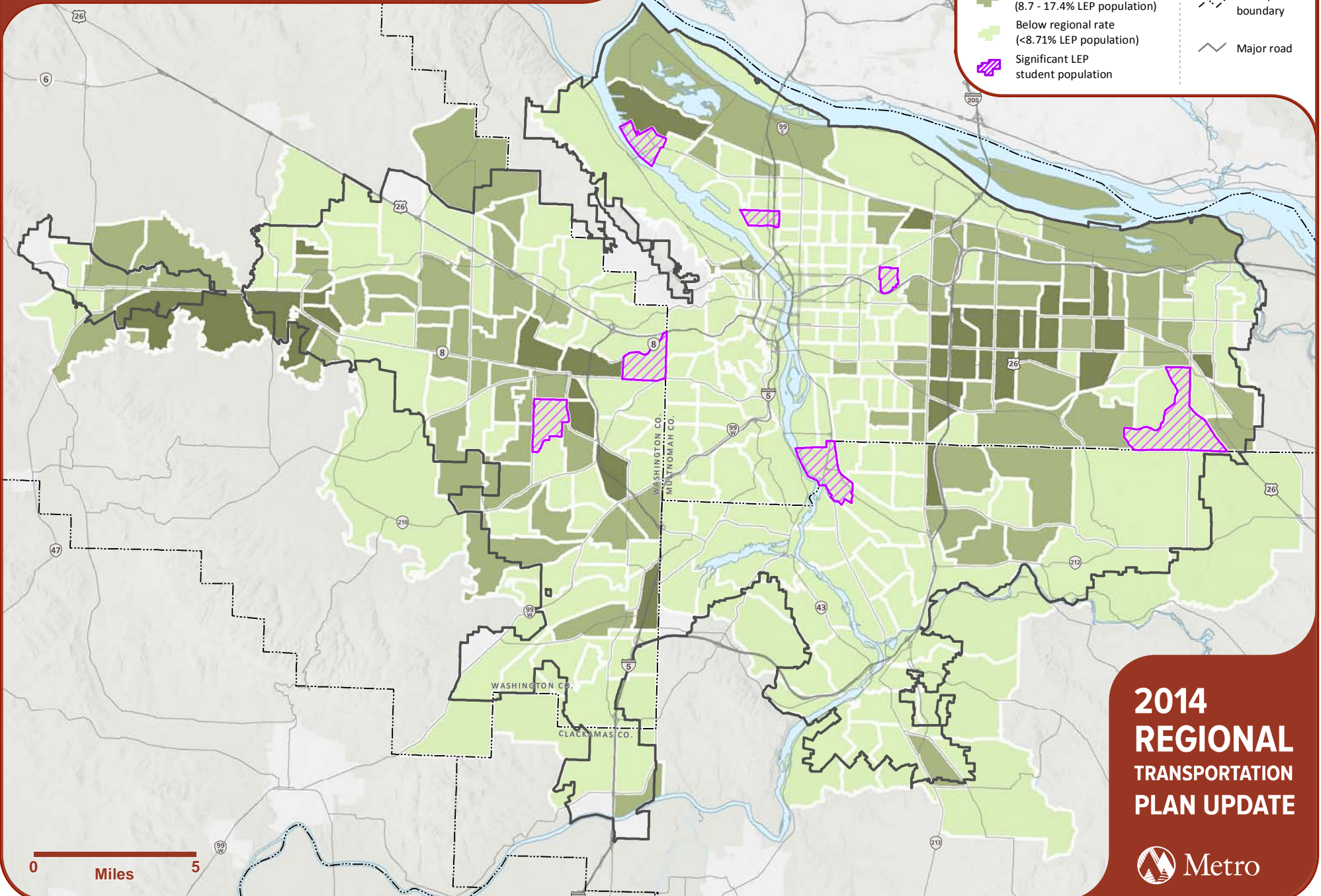
Limited English Proficiency

DISTRIBUTION OF POPULATION SPEAKING ENGLISH "LESS THAN VERY WELL"

Limited English Proficiency (LEP)

-  More than twice regional rate ($\geq 17.4\%$ LEP population)
-  Above regional rate (8.7 - 17.4% LEP population)
-  Below regional rate ($< 8.71\%$ LEP population)
-  Significant LEP student population

-  Urban growth boundary
-  County boundary
-  Major road



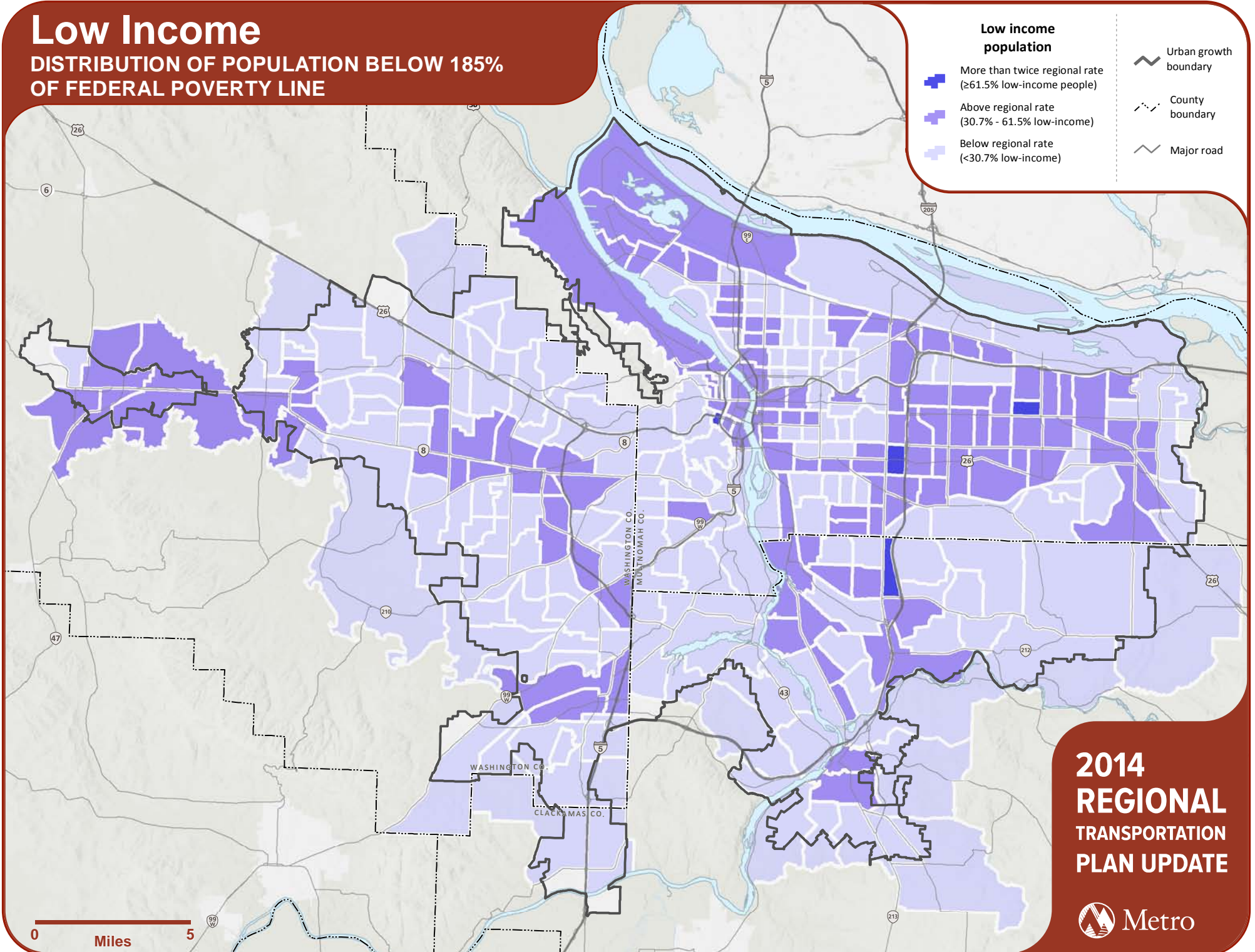
**2014
REGIONAL
TRANSPORTATION
PLAN UPDATE**



Data sources: U.S. Census, 2008-2012 American Community Survey, Table DP02 (census tract scale); 2011-2012 Oregon Department of Education. Additional tracts identified as strong likelihood of concentrated limited English proficiency population based on language spoken at home data from the Oregon Department of Education. Created February 27, 2014 at M:\plan\dr\projects\14022_EJ_TitleVI_2014\DXDs\LimitedEnglish.mxd. Transportation investments shown are those which have an identified spatial element provided by the local nominating agency. Programmatic projects including regional programs are not shown.

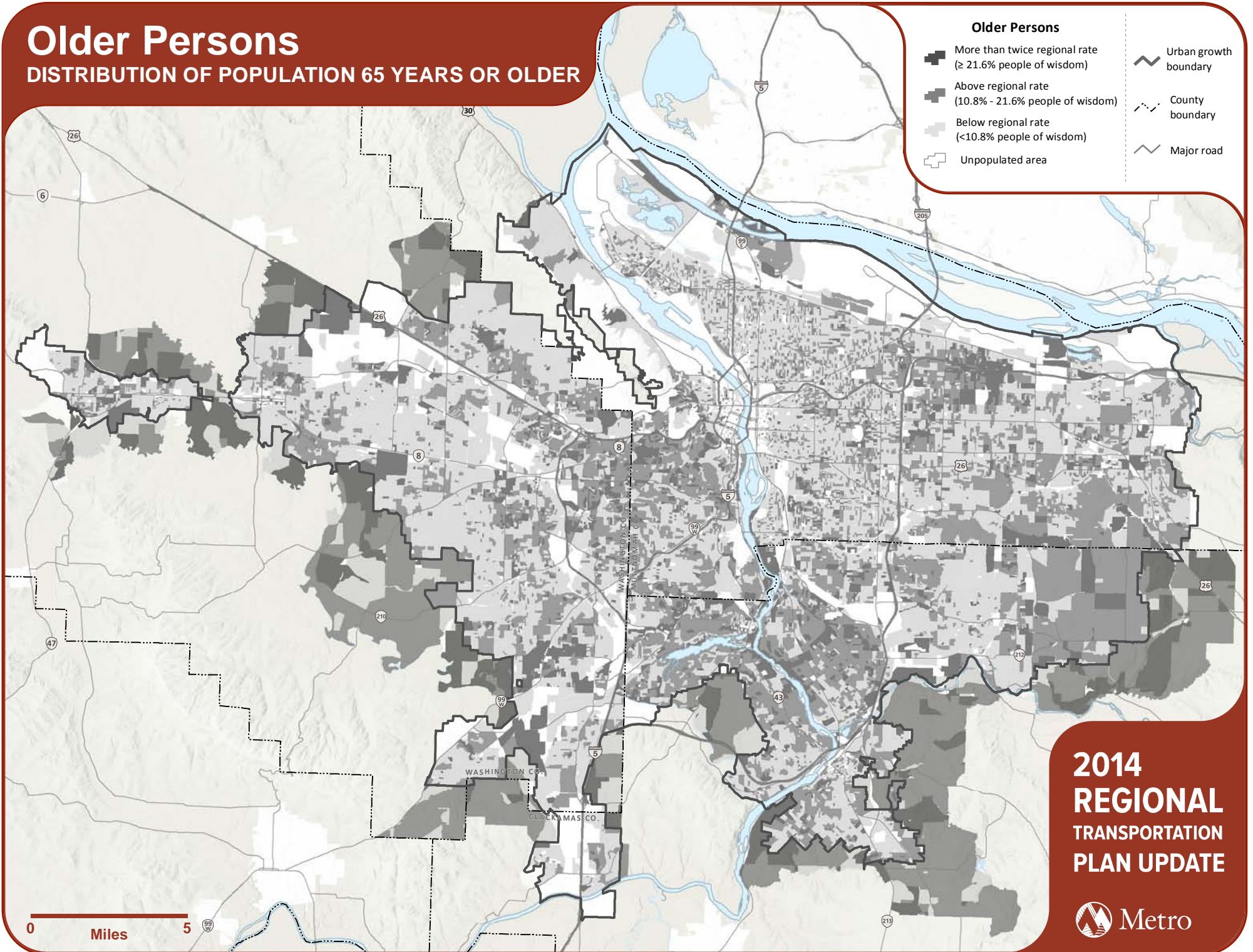
Low Income

DISTRIBUTION OF POPULATION BELOW 185% OF FEDERAL POVERTY LINE



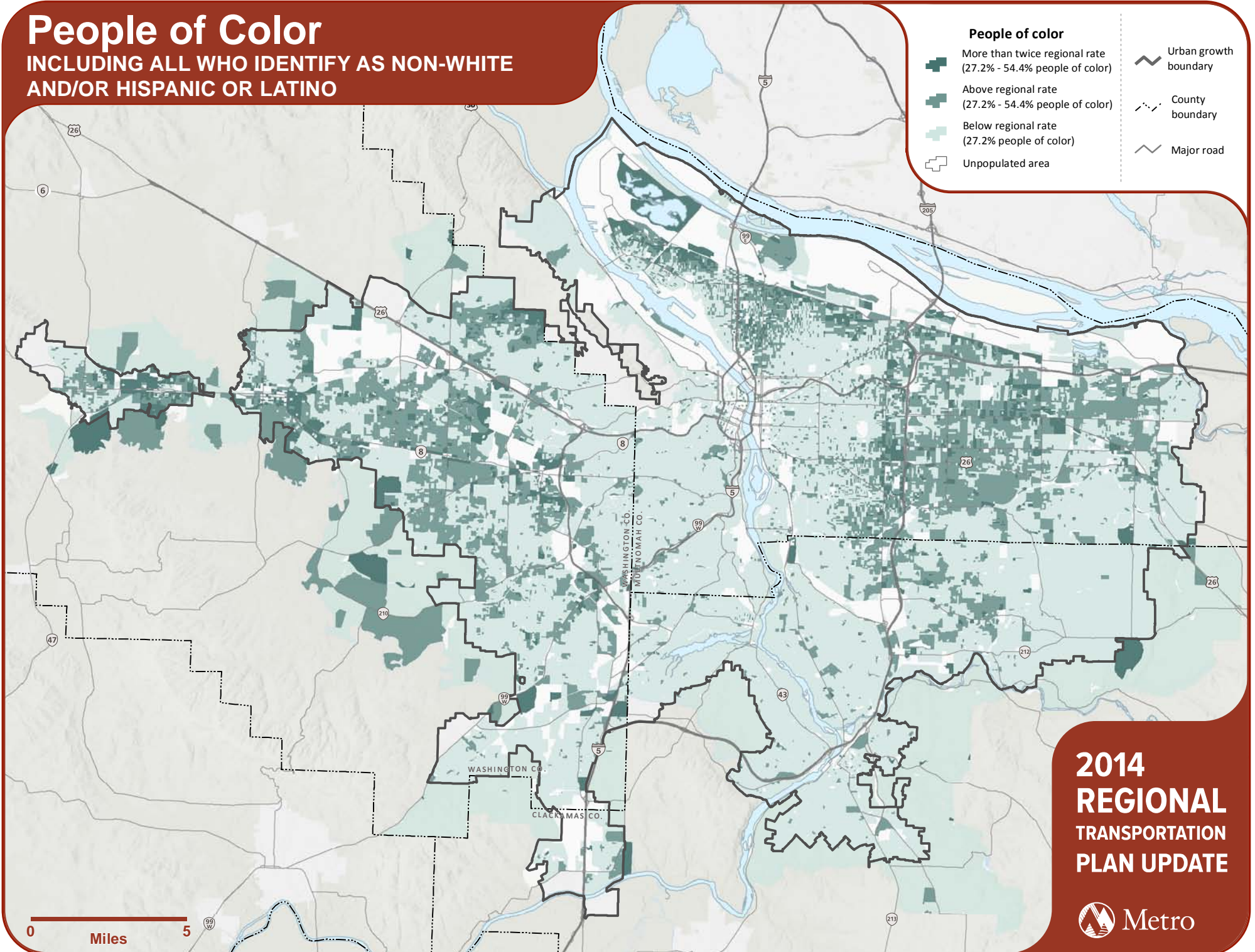
Older Persons

DISTRIBUTION OF POPULATION 65 YEARS OR OLDER



People of Color

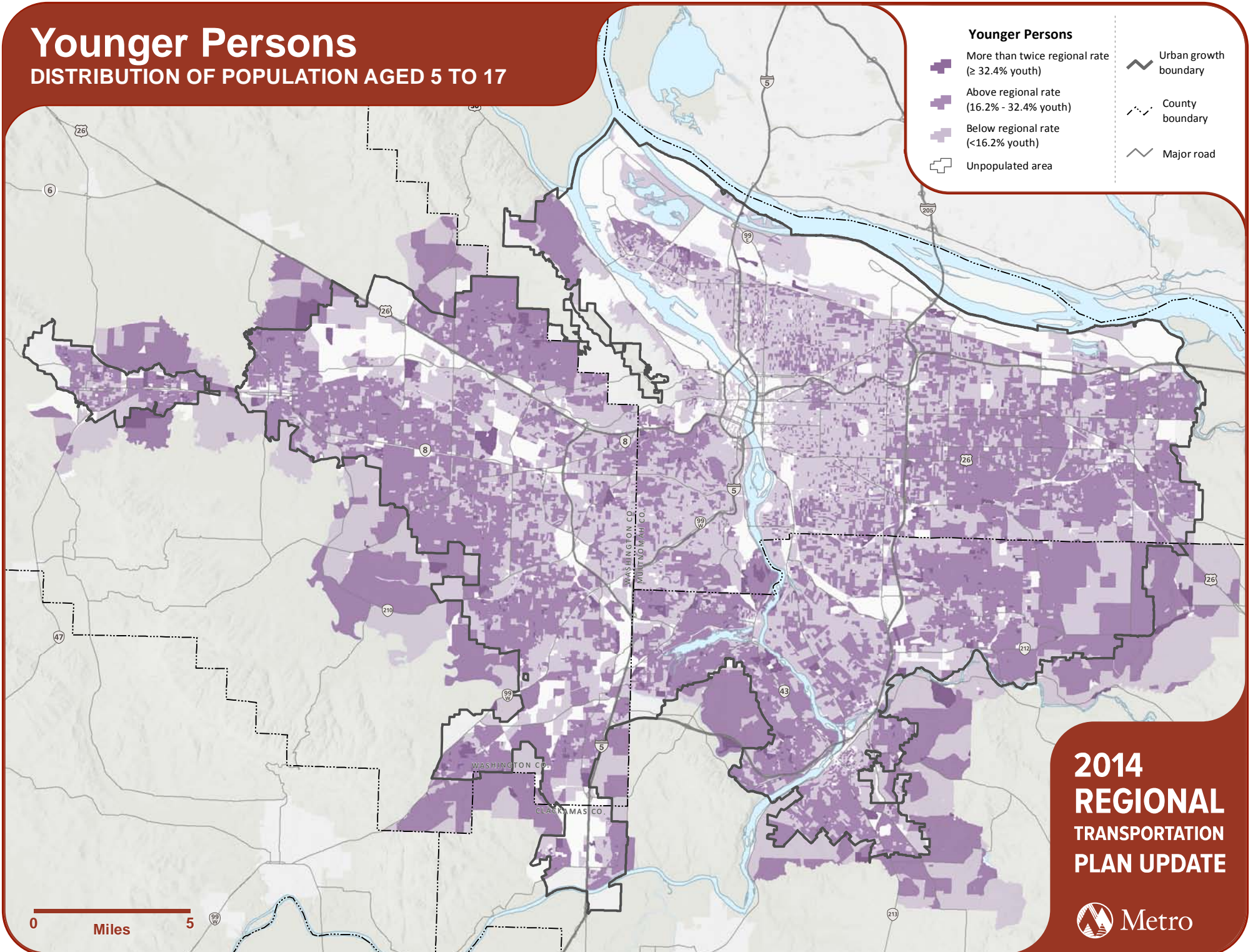
INCLUDING ALL WHO IDENTIFY AS NON-WHITE
AND/OR HISPANIC OR LATINO



Data source: U.S. Census Bureau, 2010 Census Summary File 1, Table P9 (census block scale). Created February 27, 2014 at M:\plan\drp\projects\14022_EJ_TitleVI_2014\ID_MXD\PeopleOfColor.mxd
Transportation investments shown are those which have an identified spatial element provided by the local nominating agency. Programmatic projects including regional programs are not shown.

Younger Persons

DISTRIBUTION OF POPULATION AGED 5 TO 17



Transportation Policy, Communication, and Coordination Assessment Report

January 29, 2014

Background

Stakeholders in the non-Metro areas of ODOT Region 1 have increasingly expressed concerns regarding their desire to have more input into decisions related to priorities for transportation funding. The primary tool that the Oregon Transportation Commission and ODOT relies upon for public engagement for the State Transportation Improvement Plan (STIP) and other statewide transportation policy planning processes is through Area Commissions on Transportation (ACTs). ODOT Region 1 is the one area in the State where there is not an ACT. The urban portion of Region 1, the areas that falls within the Metro boundary, is represented by JPACT, where there is inter-jurisdictional coordination for transportation project funding recommendations and public engagement. The areas outside of the Metro boundary, which mostly fall in Clackamas County and Hood River County, do not have the same opportunity for project coordination and public engagement.

Over the past several years, some rural Clackamas County stakeholders have been exploring the creation of a rural ACT. This led to the introduction of House Bill 2945 in the 2013 legislative session, which if enacted would have created such an ACT. In response to this situation and interest in whether these or related concerns might be shared by other rural areas, ODOT, Metro and Clackamas County jointly sought the assistance of Oregon Consensus¹ to conduct a broad assessment of the issues related to current transportation decision making. Specifically, the sponsors sought a neutral assessment of issues related to representation in the decision-making process regarding transportation policies, program mechanics and project prioritization and whether and how a collaborative, agreement seeking process could be used to address these issues.

During the period of September through November of 2013, Oregon Consensus staff members conducted interviews with over 60 stakeholders representing many interests including rural communities, urban areas, statewide policy makers, planners, local and regional governments, ports, and others. This report captures the themes that emerged from those interviews and provides recommendations of potential collaborative process options to enhance transportation decision making. The list of individuals interviewed and the questions asked are available at the back of this document.

¹ Oregon Consensus (OC) is part of the Oregon Solutions Network and serves as Oregon's official program established to promote effective, collaborative approaches for public decision-making in the state. OC provides assessment, facilitation, mediation and other alternative dispute resolution services to public entities and their stakeholders throughout Oregon. OC is a university based program located in Portland State University's Hatfield School of Government. OC offers state agencies, local governments and the public a neutral forum and neutral services in support of collaborative governance. An assessment conducted by a neutral third party is often critical to assuring that information gained is given freely and analyzed without bias.

Key Themes

- Clackamas County stakeholders are the most vocal and united in desiring more input on transportation decisions impacting their area. They have pursued efforts in the past to form a rural ACT and repeatedly suggested that prior efforts should be built upon rather than discarded. However, they perceive that ODOT does not support the creation of an ACT without reasonable explanation or exploration of realistic alternatives. In addition, these stakeholders had the impression that ODOT made a commitment to meet with them on a regular basis to discuss transportation issues, but this has not happened, to their knowledge. Nevertheless, they do seem to welcome the idea of expanding the ACT to include other areas of interest including Hood River County, east Multnomah County, and perhaps northern Marion County communities in the French Prairie area. However, other stakeholders representing these areas expressed some concerns about joining with Clackamas County in a larger ACT, noting political, geographical, logistical, and other issue differences.
- Metro councilors and staff, together with Portland, Beaverton, Lake Oswego, and Multnomah County seem most satisfied with the current approach, including JPACT's representation and functions. Metro Councilors and staff are invested in their current functions and responsibilities, although they are not necessarily opposed to the formation of ACTs that do not usurp their authority. These stakeholders also point out the required MPO functions that operate in accordance with long established agreements between Metro, ODOT, the Governor's Office, and the federal government (primarily FHWA).
- Other cities and counties within the MPO are less satisfied with their representation on JPACT and feel underrepresented. Numerous parties were interested in discussing JPACT membership and, in particular, reducing the number of Metro Councilors and adding at least one city representative for each county. The issue that interviewees described as "overrepresentation" of Metro on JPACT (three Metro Councilors including the chair), often came up in the context of the requirement that the Metro Council must also approve JPACT's recommendations. (Interestingly, a 2010 Portland City Club report, *"Moving Forward, a Better Way to Govern Regional Transportation"* also addressed this issue among other relevant issues discussed in this assessment. We did not find that any of the report's recommendations were enacted, though it may serve as a useful resource moving forward.) Others were less critical of Metro representation, noting that the councilors are elected from periodically adjusted districts within the metro area based on population size. Even so, Metro critics perceive Metro Councilors as having an "urban and multimodal bias" at the expense of highway modernization projects that would otherwise benefit the transportation needs of the growing outer metropolitan ring.
- Views are mixed on the desirability of adding private sector interests to JPACT although a number of stakeholders mentioned the trucking industry and high tech industries as key stakeholders in the region whose interests should be represented on JPACT. A number of interviewees asked to learn more about how private sector interests have influenced the actions of other ACTs.
- Hood River County is also somewhat satisfied with the current approach since they have successfully received highway project funding as a result of their participation on the Region 1 STIP Committee and

their other advocacy efforts (the Bridge of the Gods project was frequently mentioned). However, they expressed more interest in joining an ACT that has a focus on transportation connections along the Gorge, across the river in Washington, and to the Mt. Hood area. Their primary concern is with their limited capacity to participate in regional meetings and a concern about their voices being drowned out by the bigger players in Region 1. Columbia River Gorge Commission staff also voiced strong interests in playing a larger role in transportation planning for the region. The geographic area that they represent includes stakeholders from both states that have been identified as logical parties for undertaking regional transportation planning work, perhaps in an ACT-like structure.

- There is a widely held perception by those both within and outside of the Metro area that there is a lack of informative dialogue between the urban and rural areas. Rural stakeholders consistently complained of the lack of appreciation for the importance of highway improvements to support the transportation of goods and services that originate in rural areas (such as farm to market roads) and to support the tourism and recreation travel needs of urban residents. Conversely, some Metro stakeholders pointed out the lack of understanding in suburban and rural areas about their requirements to achieve clean air standards through the prioritization of multimodal projects.
- Many interviewees cited the Region 1 STIP selection committee, chaired by Bill Wyatt, as a good example of a region-wide collaborative effort that also included private sector interests. They also commended ODOT staff for their helpful role in this process. For these interviewees, this process provided an example of well-balanced representation. Others, particularly Metro representatives, were somewhat less satisfied with the STIP process because it resulted in disproportionate recommendations for funding projects outside of the MPO area.
- A number of people expressed that it would be difficult to change the status quo without some directive from the OTC and Governor's Office since JPACT and Metro's composition and authority as the MPO comes from agreement between the Governor's Office and the federal government in accordance with FHWA/FTA guidelines.
- Many interviewees discussed the possibility of forming several ACTs or a larger ACT-like entity with subcommittees structured around "communities of interest" or transportation corridors. Often cited examples included the Mt. Hood triangle of Highways 84, 26 and 35, the Columbia Gorge Scenic Area, and the Clackamas and Marion County areas around Highways 211, 213, 214 and 99E.
- There are significant differences between each of the five counties (including Marion County) which would present challenges to any collaborative effort among them. These differences include political orientation, geographic dissimilarities, financial capacity—both capital and human, rural vs. urban, and multimodal-oriented vs. highway-oriented.
- Many perceive Metro's policy planning as "top down" and prefer a more traditional ACT where transportation policies and priorities emerge from the discussions of the various stakeholder interests.

Even many JPACT members expressed a desire to re-examine how transportation planning policy issues are initiated and prioritized.

- There is near-universal agreement that the most significant transportation-related challenge facing all stakeholders is the lack of available funding to meet growing transportation maintenance and enhancement needs throughout the region.

Process Recommendations

The assessment interviews indicated that there is broad support to move forward with a consensus-seeking process to form one or more Area Commissions on Transportation (ACTs) or ACT-like structures representing ODOT Region 1. While it is not yet clear how one or more ACTs or ACT-like structures would overlap or otherwise impact Metro and JPACT's MPO responsibilities for transportation planning, many interviewees welcomed a facilitated discussion on that specific topic, as well as how the non-metro areas of Region 1 could be better organized and more effective. The Oregon Consensus assessment process was intended to determine whether there was potential for a collaborative process to be helpful and, if so, to recommend suggested processes to advance this conversation.

Based on the interview process, we believe that a collaborative effort may be beneficial provided that: A) Each of the co-sponsors indicate a willingness to consider new alternative models for transportation planning and project selection in the region, B) a broad-based group of stakeholders is engaged to fairly represent the many diverse regions and interests throughout the region, and C) clear objectives and a limited time frame are agreed upon by the participants.

With these provisions in mind, we recommend the following processes as potential next steps:

1. That the Governor's Office convene an ODOT Region 1 task force comprised of representatives of diverse interests in the region facilitated by a neutral entity, and charged with the following tasks:
 - a. Review the summary and recommendations of the Oregon Consensus Assessment Report and seek additional comments and ideas from task force members.
 - b. Reach consensus on task force objectives and develop an agreed upon timeframe for completing the tasks below.
 - c. Examine the history and experiences of other Oregon ACTs and urban/rural areas in other states that include or are adjacent to MPOs.
 - d. Develop one or more alternatives for the creation of one or more ACTs representing transportation interests within ODOT Region 1. These alternatives would include working assumptions about any overlap in responsibilities and coordination with the MPO/JPACT/Metro and would consider needs for addressing the community of interest with the Columbia River Gorge Scenic Area, including appropriate Washington stakeholders as an ACT or ACT-like structure.

- e. Plan a region-wide transportation summit for participation by all the region's transportation stakeholders. The summit would be designed by the task force and could include the following elements:
 - i. Summit opening remarks by the OTC Chair or ODOT Director and/or Governor's Office representative to indicate their willingness to consider a consensus-based proposal.
 - ii. Presentation of the Oregon Consensus assessment process and findings
 - iii. Overview of regional funding allocations and methodology
 - iv. Overview of the history and experience of Oregon ACTs and MPOs
 - v. Presentation of two or more alternatives for creation of ODOT District 1 ACTs or ACT-like structures
 - vi. Breakout discussions to evaluate and comment on the alternatives
 - vii. Reporting back to the larger group
 - viii. Closing remarks including delivery of the assignments and expectations for the task force moving forward.
 - f. Review the results of the summit and select one or more alternative models for further study and stakeholder review.
 - g. Receive public and stakeholder comments on the selected alternative(s).
 - h. Seek collaborative agreement on a new structure and/or modified structures for transportation planning and project selection in the region.
 - i. If one or more ACTs or ACT-like structures are recommended, develop a proposed charter(s) for submission to the OTC. Alternatively, recommend other steps for improving transportation planning coordination within the region.
2. That the Metro Council give advance consideration to the issue of JPACT membership composition (as raised in the third theme on page 2) and whether it might be advantageous to initiate this conversation with JPACT members and other interested parties as a facilitated discussion independent from the broader discussion of creating new ACTs or ACT-like structures in Region 1. Alternatively, this issue should be dealt with as part of the discussion of how JPACT might look different within one or more of the structures that the task force examines.

Individuals Interviewed

Paul Koch (Port of Cascade Locks)
Bob Reeves (Village at Mt. Hood)
Mike Wagner (Mulino Hamlet)
Margaret Middleton (City of Beaverton)
Bill Wyatt (Port of Portland)
Rob Sadowsky (Bicycle Transportation Alliance)
Commissioner Janet Carlson and Don Russo
(Marion County)
Nancy Boyer and Richard Schmidt (Mid Willamette
Valley COG)
Donna Jordan (Lake Oswego City Council)
Brian Hodson (Mayor of Canby)
Michael McElwee (Port of Hood River)
Jason Tell (ODOT)
Diane McKeel (Multnomah County Commission)
Joanna Valencia and Sean Files (Multnomah County)
John Ludlow (Clackamas County Commission)
Roy Rogers (Washington County Commission)
Andy Cotugno and Ted Leybold (Metro)
Kathryn Harrington (Metro Council)
Shirley Craddick (Metro Council)
Darren Nichols, Jennifer Kaden and Jeff Litwak
(Columbia River Gorge Commission staff)
Shane Bemis (Mayor of Gresham; written answers)
Josh Alpert (Portland Mayor's office)
Steve Bates (Boring CPO)
Paul Savas (Clackamas County Commission)
David Meriwether (Hood River County) and Karen
Joplin (Hood River County Commission)
Pat Egan (Oregon Transportation Commission)
Deborah Rogge (Mayor of Molalla)
Representative Bill Kennemer (Oregon State
Legislature)
Jerry Wiley (Mayor of Hillsboro)
Don Odermott and Rob Dixon (City of Hillsboro)
Carlotta Collette (Metro Council)

Groups Interviewed

Clackamas County C4 Metro Advisory Committee:

Paul Savas (Clackamas County Commission)
Tim Knapp (Mayor of Wilsonville)
William Wild (Oak Lodge Sanitary District)
Jody Carson (West Linn City Council)
Betty Mumm (Oregon City Commissioner)
Wilda Parks (citizen member, MPAC)
Stephen Lashbrook (SMART)
Nancy Kraushauer (Wilsonville)
Dan Chandler (Clackamas County)
Doug Neely (Mayor of Oregon City)
Jeff Gudman (Lake Oswego City Councilor)
Carlotta Collett (Metro Council)
John Ludlow (Clackamas County
Commission)
Mayor Lori DeRemer (Happy Valley)
Martha Schrader (Clackamas County
Commission)
Karen Buehrig (Clackamas County)

Clackamas County REACT Committee:

Marge Stewart (Firwood CPO)
Bill Merchant (Beavercreek Hamlet)
Warren Jones (Mulino Hamlet)
Bob Reeves (Villages at Mt. Hood)
Pat Sharp (Villages at Mt. Hood)
Charlene DeBruin (Eagle Creek-Barton)
Windy Ingle (Stafford Hamlet)
Mike Wagner (Mulino citizen)
Laurie Freeman Swanson (Molalla CPO)
Glenn Koehrsen (TSP Committee)

French Prairie Forum Group:

Greg Leo (lobbyist)
Don Russo (Marion County)
Mayor Catherine Fidley (Woodburn)
Bill Graupp (Mayor of Aurora)
Mark Ottenad (Wilsonville)
Nancy Kraushaur (Wilsonville)
Bryan Brown (Canby)

Interview Questions

1. Please tell us about your background, affiliation, involvement and interests with respect to transportation policy and or programs.
2. What do you see as the major issues that need to be addressed related to transportation policy and coordination among ODOT, Metro, and the city and county governments within Clackamas, Hood River, Marion, Multnomah and Washington counties?
3. What are the challenges or barriers to addressing these issues? Do you have any suggestions for how they might be overcome?
4. What approach or process would be helpful for addressing the above topics and why?
5. What do you see as the appropriate scope and scale of a potential collaborative effort?
6. What do you think will happen if the “status quo” continues?
7. Are there lessons learned from past efforts to resolve these issue that you think should be applied to future effort?
8. Do you think there are information/data gaps and if so, what are the sources of data and resources do you think should be utilized and considered?
9. Is there anyone else you think we should be interviewing?
10. What should we have asked that we did not?
11. Do you have any questions for us?

Materials following this page were distributed at the meeting.

Transportation Funding in the 2015 Legislative Session

4/7/14

1. Past Transportation Funding Measures:

- 2001/2003: Oregon Transportation Investment Act 1,2 and 3 including a \$.6 billion bridge program in OTIA 3.
- 2009: Jobs and Transportation Act – 6-cent gas tax, increased titling fees and vehicle registration fees; increased heavy vehicle registration fees and weight-mile fees; Highway modernization plus maintenance; heavily earmarked; pass-thru to cities/counties; created an Urban Trail Fund; Connect Oregon - \$100 million; pre-empted local gas taxes and vehicle registration fees; enabled Sellwood Bridge local VRF.
- 2005 – 2013: Connect Oregon 1,2,3,4 and 5 – Multi-modal non-highway grants and loans; total \$400 million of lottery backed bonds.
- 2013: \$450 million bonding authority for Columbia River Crossing; now defunct.
- Continued decline of the state and federal gas tax has led to increased reliance on local gas taxes and street utility fees for maintenance; although implementation is uneven across the metro region.

2. Signs of a 2015 Transportation Funding Measure:

- Governor's office has indicated intent to develop a proposal.
- Oregon Transportation Forum has stepped up to develop a proposal around an "All Modes" Fix-It and Enhance framework.
- Regional staff discussions underway.
- Better economic conditions make a package more promising.

3. Issues and Opportunities:

- The RTP Update is what we are all agreeing we want to implement and it can't be done without increases in transportation revenues at the federal, state and local levels.
- The Climate Smart Communities project demonstrates that this region can meet greenhouse gas reduction targets adopted by the Legislature, but only with sufficient revenues to implement our adopted plans; if we fall short, we will not hit our targets.
- Purchasing power of the gas tax continues to decline; 6-cent increase adopted in 2009 JTA is falling short of projection.
- Titling fees, registration fees and weight-mile taxes on heavy trucks do not decline.
- VMT fee on high mileage vehicles failed in the 2013 Legislature but is likely to return.
- Connect Oregon Plus was introduced in 2013 Legislative Session – would dedicate 18% of lottery proceeds, split the fund 50/50 between passengers and freight and add to the passenger share bike/ped (which was done in Connect Oregon 5) and transit operations (in addition to transit capital which was included in Connect Oregon 1 thru 5).

- There is a growing experience in selecting projects through a multi-modal project selection process (through the Regional Flexible Fund Allocation by JPACT/Metro and statewide through the Enhance program).
- Loss of BETC funds is a significant blow to downstate transit providers; lifeline transit service is in jeopardy.
- AMTRAK is shifting \$26 million per biennium in operating cost to Oregon for the Eugene to Vancouver, BC passenger rail service.
- There is a growing interest in funding improvements to ODOT orphan highways to facilitate more jurisdictional transfers and allow these roads to serve their community in ways that is not possible under ODOT jurisdiction.
- The Oregon Resilience Plan identifies priority investments needed to speed recovery from a Cascadia Earthquake.
- Earmarks were a big part of the Jobs and Transportation Act.
- Federal transportation funding is at best uncertain.

4. What are JPACT members interested in pursuing? Should we develop a regional position on a package?



JOINT POLICY ADVISORY COMMITTEE ON TRANSPORTATION
March 13, 2014
Metro Regional Center, Council Chamber

MEMBERS PRESENT

Jack Burkman
Craig Dirksen, Chair
Carlotta Collette
Shirley Craddick
Nina DeConcini
Donna Jordan
Neil McFarlane
Diane McKeel
Steve Novick
Paul Savas
Jason Tell
Don Wagner

AFFILIATION

City of Vancouver
Metro Council
Metro Council
Metro Council
Oregon Department of Environmental Quality
City of Lake Oswego, representing Cities of Clackamas Co.
TriMet
Multnomah County
City of Portland
Clackamas County
Oregon Department of Transportation
WSDOT

MEMBERS EXCUSED

Shane Bemis
Denny Doyle
Roy Rogers
Steve Stuart
Bill Wyatt

AFFILIATION

City of Gresham, representing Cities of Multnomah Co.
City of Beaverton, representing Cities of Washington County
Washington County
Clark County
Port of Portland

ALTERNATES PRESENT

Lisa Barton Mullins
Jef Dalin
Curtis Robinhold

AFFILIATION

City of Fairview, representing Cities of Multnomah Co.
City of Beaverton, representing Cities of Washington County
Port of Portland

STAFF: Taylor Allen, Andy Cotugno, Kim Ellis, Dan Kaempff, Ted Leybold, Lake McTighe, John Mermin, Steve Wheeler.

1. CALL TO ORDER, DECLARATION OF A QUORUM & INTRODUCTIONS

Chair Craig Dirksen declared a quorum and called the meeting to order at 7:30 a.m.

2. CITIZEN COMMUNICATIONS ON JPACT ITEMS

There were none.

3. UPDATES FROM THE CHAIR & COMMITTEE MEMBERS

Chair Dirksen updated members on the following items:

- Troy Rayburn has succeeded in Kelsey Newell's role as Metro's new Legislative and Regional Engagement Coordinator.
- The Annual JPACT Lobbying trip to Washington, D.C. coincided with the release of President Obama's budget, which included a four-year transportation authorization bill. The meetings with the Congressional delegation, staff and US DOT representatives addressed challenges regarding transportation funding and strategies for effective implementation. A promising result included opportunities for partnership with Transportation 4 America (T4 America) on developing regional coalitions to lobby Congress on transportation priorities.
- Update on Federal Transportation Revenue Proposal from T4 America, Resolution 14-4501. JPACT Members anticipate further action in April after additional time for consultation amongst their councils and coordinating committees.
- The two joint JPACT/MPAC Committee Meetings are scheduled to occur on April 11 and May 30, 2014.

4. CONSIDERATION OF THE MINUTES FOR FEBRUARY 13, 2014

MOTION: Neil McFarlane moved, Councilor Donna Jordan seconded, to approve the JPACT Minutes from February 13, 2014.

ACTION: With all in favor, the motion passed.

5. CLIMATE SMART COMMUNITIES SCENARIOS PROJECT: DISCUSS STEP 3 BACKGROUND INFORMATION

Kim Ellis of Metro provided an overview of the upcoming public engagement efforts being conducted for the Climate Smart Communities Scenarios Project to inform upcoming JPACT and MPAC discussions to shape the draft preferred approach.

The Climate Smart Communities Scenarios Project was initiated in response to a mandate from the 2009 Oregon Legislature to reduce per capita greenhouse gas emissions from cars and small trucks by 20 percent below 2005 levels by 2035. The goal of the project is to engage community, business, public health and elected leaders in a discussion to shape a preferred approach that accommodates expected growth, meets the state mandate and supports local and regional plans for downtowns, main streets and employment areas.

In February, MPAC and JPACT approved moving forward with the eight-step process to shape and adopt a preferred approach in 2014, which is included as part of the meeting record in [ATTACHMENT 1]. As recommended by MPAC and JPACT, the preferred approach that is developed will start with the plans that cities, counties and the region have adopted – from local zoning, capital improvement plans, comprehensive and transportation system plans to the 2040 Growth Concept and Regional Transportation Plan.

From January to May 2014, Metro is facilitating a Community Choices discussion to explore policy choices and trade-offs. The engagement activities will build upon earlier public engagement to solicit feedback from public officials business and community leaders, interested members of the

public and other identified audiences. Online comment opportunities, interviews, discussion groups, and statistically valid public opinion research will be used to collect input on issues such as: perceptions of the region's transportation system; access to jobs; affordable housing and transportation options.

During this period, community and business leaders, local governments and the public will also be asked to weigh in on which investments and actions should be included in the region's preferred approach, with a focus on the policy questions proposed for discussion and input: 1) What mix of investments and actions best support your community's vision for health and equitable communities and a strong economy while reducing green house gas emissions? 2) Given the current uncertainty around transportation funding, how should we pay for investments needed to realize our shared vision for walkable communities, job creation, and affordable housing and transportation choices?

Engagement activities are coordinated with the 2014 Regional Transportation Plan update comment period that is planned for March 21 to May 5, 2014. [FIGURE 1] provides a summary of Phase 3 engagement activities and Council milestones for reference as a part of the meeting record. A public engagement summary report and recommendations for the draft preferred approach will be provided to the Metro council and Metro's policy advisory committees at the first joint MPAC/JPACT meeting.

Member comments included:

- Mr. Neil McFarlane of TriMet provided a brief update on Service Enhancement Plans and he highlighted innovate transit strategies implemented throughout the Metropolitan region such as partnerships with community transit providers like GroveLink in Forest Grove. The TriMet proposed budget was recently released and includes a growing level of service.
- Mr. Jason Tell of Oregon Department of Transportation (ODOT) highlighted the expansive community outreach and engagement efforts initiated with Climate Smart Communities Scenarios Project and the RTP Update, and he encouraged JPACT members to conduct effective communication with the community regarding funding needs for project implementation.

6. PREVIEW OF 2014 PUBLIC REVIEW DRAFT OF THE REGIONAL TRANSPORTATION PLAN

Metro is required to complete a periodic update of the Regional Transportation Plan (RTP) in order to maintain continued compliance with the Federal Clean Air Act. The Metro Council and JPACT adopted a work program in September, 2013. Because of the limited available resources and overlap with the climate Smart Communities Scenarios Project, the 2014 RTP Work Program was scaled to focus on critical policy and project updates needed in the near term, while deferring less developed issues to the subsequent RTP update.

A primary focus of the 2014 RTP Update has been to meet state and federal requirements, and to incorporate recommendations from the Regional Active Transportation Plan (ATP) and Regional Safety Plan. The vast majority of edits to the RTP document are technical in nature. The policy edits are located primarily in Chapter Two biking and walking sections. These edits strengthen existing polices and provide additional detail to reflect the Regional Active Transportation and Regional Safety Plans but do not propose any dramatic shifts in policy direction. [ATTACHMENT 1] of the meeting record includes an overview of the changes proposed in the draft 2014 RTP.

In addition to revisions of the RTP document, the 2014 work program included updating the project list. These updates were limited to projects that originated from a local public process such as a transportation system plan or corridor plan. In December 2013, local jurisdictions and partner agencies submitted to Metro new projects as well as changes to existing projects.

May 8, 2014 JPACT is anticipated to review a summary of public comments received and potential refinements to the RTP, and will be asked to take action to preliminarily approve the RTP – pending the results of an air quality conformity determination.

Member comments included:

There were none.

7. PREVIEW OF PUBLIC REVIEW DRAFT OF THE ACTIVE TRANSPORTATION PLAN WORK GROUP REFINEMENTS AND REGIONAL TRANSPORTATION PLAN EDITS

Lake McTighe of Metro provided a side-by-side comparison of changes made to pedestrian and bicycle policies in the draft 2014 RTP. The bicycle and pedestrian policies were updated to reflect policy direction developed through the draft Regional Active Transportation Plan (ATP). Overall, the RTP bicycle and pedestrian policies were not changed substantively, but were strengthened and enhanced.

As an attachment to the record, the [MEMO] includes a detailed summary of comments and edits reflected in the Public Review Draft of the ATP that were provided by a regional work group convened at the request of JPACT and MPAC. The work group was convened to provide input on and finalize the draft ATP prior to the plan being proposed for adoption in July 2014.

An example of edits and revisions to the Draft 2014 ATP included:

RTP Chapter 2, Pedestrian Policy 1

Was: *Promote walking as primary mode for short trips.*

Now: *Make walking and bicycling the most convenient, safe and enjoyable transportation choices for short trips less than three miles.*

Comments were provided by the work group between October 2013 and February 2014 verbally at five meetings and through written comments. Additionally, suggested edits and comments provided by members of TPAC and MTAC are also reflected in the attached preview Public Review Draft of the ATP. Members of TPAC and MTAC received notice of the preview Public Review Draft of the ATP. Metro staff is seeking final comments from TPAC and MTAC on the Public Review Draft of the ATP prior to its official release for public comment on March 21.

Member Comments Included:

There were none.

8. REGIONAL FLEXIBLE FUND RETROSPECTIVE FINDINGS

Dan Kaempff of Metro provided an informational presentation in which he summarized responses to an online survey that elicited feedback from partners regarding the project selection process for the 2016-18 Regional Flexible Funds Allocation (RFFA).

A new, three step allocation process was adopted for the 2016-18 RFFA based on Metro Resolution 12-4383. Step one considered and approved funding levels for the five existing region-wide programs. Step two established sub-regional funding targets, and two competition areas. Projects were nominated by local jurisdictions and had to demonstrate the criteria set forth by the 2016-2018 RFFA policy direction. A total of 24 projects were nominated between the two competition areas. Step three nominated the Regional Economic Opportunity Fund (REOF) projects.

Metro staff conducted an online survey to receive feedback from jurisdictions and interested parties composed of 209 individuals from throughout the region on the effectiveness of the RFFA process at selecting projects that advanced regional goals and policy. Twenty responses were received, 15 responses originated from local government staff and elected officials. The survey included questions in five categories: Tools, Coordination, Public Outreach, Process and Policy. Some of the suggested improvements included: More direction on public involvement process, incorporate qualitative factors into the evaluation process and more information about broad unmet transportation needs and equity. Some issues and concerns in the survey results included difficulty discerning differences in suburban areas using Transportation Disadvantaged maps, limitations in areas of higher concentration of Environmental Justice populations and the potential for a subjective analysis of criteria in regards to jurisdictions on the edge of the Metro area. [ATTACHMENT 1] included as a part of the meeting record provides a detailed synopsis of the survey findings.

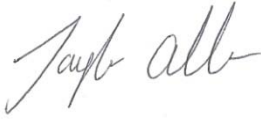
Member Comments Included:

- Members asked clarifying questions about whether TPAC determined the specificity of the parts of the policies in the 2016-18 RFFA process that should be evaluated and how the awarded projects reflected the policy direction. Mr. Kaempff stated that there was a general indication that the entire RFFA policy needed to be evaluated.
- Members expressed concern about the low survey response and how it would be utilized in the future to inform further decision making.
- Members highlighted the need for communication to local governments about changes in policies on both the federal and state level in regards to the ways in which project funding should be prioritized.
- Members suggested that evaluation and concerns regarding the 2016-18 RFFA process should be solicited from various interested parties while the process is underway.

9. ADJOURN

Chair Collette adjourned the meeting at 9:02 a.m.

Respectfully Submitted,



Taylor Allen

Recording Secretary

ITEM	DOCUMENT TYPE	DOC DATE	DOCUMENT DESCRIPTION	DOCUMENT No.
6	PPT	3/13/14	Status Update & Overview of Proposed Changes to draft 2014 RTP	31314j-01
7	Memo	3/12/14	2014 RTP Pedestrian and Bicycle Policy Updates	31314j-02
7	PPT	3/13/14	Preview Public Review Draft of the Regional Active Transportation Plan	31314j-03
8	PPT	3/13/14	2016-18 Regional Flexible Funds Allocation Retrospective	31314j-04
N/A	Memo	3/13/14	2013-15 Unified Planning Work Program (UPWP) Update	31314j-05



Oregon

John A. Kitzhaber, M.D., Governor

Department of Transportation

Office of the Director

355 Capitol St NE

Salem, OR 97301

Phone: (503) 986-3289

Fax: (503) 986-3432

March 10, 2014

The Honorable Greg Walden
Member of Congress
2182 Rayburn
Washington, DC 20515

Dear Congressman Walden:

Secretary of Transportation Anthony Foxx recently announced that the federal Highway Trust Fund's Highway Account will exhaust its balances sometime this summer. If Congress does not address this problem, the Federal Highway Administration (FHWA) will be unable to fully and promptly reimburse states for their expenses under the federal-aid highway program, forcing states to in effect float a loan to the federal government. What's more, in 2015 funding for the highway program may have to be zeroed out, as all revenue flowing into the Highway Account would be needed to pay for past obligations, leaving no money for new projects. And in future years funding for highway, transit and safety projects would have to be cut by about \$15 billion, around 30 percent to align expenditures with revenues.

Because of the potential impact to transportation projects, the Oregon Department of Transportation (ODOT) is closely monitoring the situation. If the federal government temporarily can't fully pay its bills on time this summer, ODOT currently has sufficient cash on hand to be able to pay contractors, so we don't anticipate having to shut down current projects. However, we are very concerned about our construction program in 2015 and beyond. Eliminating funding for the highway program in 2015 would reduce Oregon's federal highway funding by about \$470 million. ODOT would have to cancel or delay projects totaling that amount, which would cost the state an estimated 4700 jobs.

In the long term post 2015, Oregon's future federal transportation funding would be cut by more than \$150 million each year if Congress does not provide additional resources for the Trust Fund. A federal funding reduction of this magnitude would require ODOT to cut a large number of state and local projects that are already programmed in the Statewide Transportation Improvement Program (STIP). Local governments would be hit hard, as they receive 25-30 percent of Oregon's federal highway funding. Cuts to transit programs could run more than 40 percent, which could force transit agencies to make deep service reductions and cause significant hardship for those who rely on public transit. Federal transportation funding cuts of this magnitude would have large impacts on the nation's economy, the safety of those traveling on our roads, and the livability of our communities.

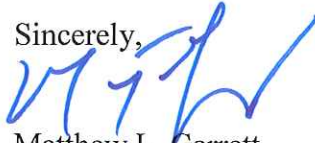
Given the significant uncertainty about the future, ODOT will proceed conservatively until Congress has acted to provide greater certainty on funding. If Congress has not resolved funding for all of 2015 by early this fall, we will have to delay sending some projects to bid and construction. The uncertainty will also impact our development of projects for future years: Without long-term sustainable funding ODOT will have to make conservative assumptions about

ODOT 03/10/14 Hwy Trust Fund

federal funding as we begin to develop the 2017-2020 STIP, reducing the number of projects we will be able to develop.

In order to avoid significant negative impacts to Oregon's transportation system, our economy, and our communities, I cannot advocate strongly enough for Congress to take action and provide adequate, sustainable, long term funding for the Highway Trust Fund.

Sincerely,



Matthew L. Garrett
Director

Unified Planning Work Program

Update to the 2013-15 UPWP

Chris Myers, Metro



What is the UPWP?

- Federally-required document
- Detailed descriptions of transportation planning tasks and relationships to other planning activities in the region.
- Summary of amount/source of funds
- Input from: TriMet, ODOT, FHWA, FTA, and local governments



What's new in the UPWP?

- Updates to planning project narratives, budget info, one MOU, and...
- Three new planning projects:
 1. Regional Intelligent Transportation System (ITS) Communications Master Plan (**pg. 84**)
 2. Regional Intelligent Transportation System (ITS) Architecture Update (**pg. 86**)
 3. N/NE Quadrant & I-5 Broadway/Weidler Additional Analysis (**pg. 112**)



What is MPO Self Certification

- Formal certification review every 4 years
- Self certification in the intervening years
 - MPO confirms compliance with federal transportation planning requirements
 - Prerequisite to receiving federal transportation funds



Next Step

- Metro Council, consent agenda, May 1st



Questions

Contact:

Chris Myers

Regional Transportation Planner

chris.myers@oregonmetro.gov

503-813-7554

