



How **Neighborhood Planning** **Affects Health** in Globeville and Elyria Swansea

SEPTEMBER 2014



DENVER
ENVIRONMENTAL HEALTH

Be Healthy **Denver**

COMMUNITY HEALTH MATTERS

Primary Authors

Denver Department of Environmental Health

Gretchen Armijo, MURP

Built Environment Administrator

Gene C. Hook, MS

Environmental Scientist

Contributors

Denver Department of Environmental Health

Dave Erickson, MS

Environmental Site Assessment Program Manager

Jon Novick, MS

Environmental Public Health Analyst, Water Quality

Lisa Farrell

Environmental Chemist

Paul Riedesel

Investigator II, Denver Community Noise Program

Brenda Johnson

GIS Analyst

Stacey McConlogue, MPH

Denver Healthy People Program Manager

Gregg Thomas, MS

Acting Division Director,

Environmental Quality Division

Jessica Scott

Air Quality Administrator

Suggested Citation

Denver Department of Environmental Health.
September 2014. *How Neighborhood Planning Affects
Health in Globeville and Elyria Swansea*. Denver, CO.

Who to Contact

Gretchen Armijo, MURP

Built Environment Administrator

Denver Department of Environmental Health

Gretchen.armijo@denvergov.org

www.behealthydenver.org

720-865-5465



Acknowledgments

Mayor Michael B. Hancock

Denver City Council

District 1 – Susan K. Shepherd
District 2 – Jeanne Faatz
District 3 – Paul D. Lopez
District 4 – Peggy Lehmann
District 5 – Mary Beth Susman
District 6 – Charlie Brown
District 7 – Chris Nevitt
District 8 – Albus Brooks
District 9 – Judy H. Montero
District 10 – Jeanne Robb
District 11 – Christopher Herndon
At-Large – Robin Kniech
At-Large – Debbie Ortega

Globeville Neighborhood Plan Steering Committee

Elyria Swansea Neighborhood Plan Steering Committee

Department of Environmental Health

Doug Linkhart, *Executive Director*
Robin Valdez
Michele Shimomura
Mondi Mason
Meghan Hughes
Kerra Jones

Community Planning and Development

Brad Buchanan, *Executive Director*
Steve Gordon
Courtland Hyser
Tim Watkins
Steve Nalley
Michelle Pyle
Andrea Santoro

Councilwoman Judy H. Montero,

Denver City Council, District 9

Nola Miguel
Amanda Sandoval
Benjamin Roldan-Rojas

Department of Public Works

Karen Good
Emily Silverman
Emily Snyder
Rachael Bronson
Neddra Niblet
David DiGiacomo
Sarah Anderson

Parks and Recreation

David Marquardt
Greg Kaiser
Courtney Levingston

Denver Police Department, District 1

Commander Paul Pazen
Lt. Barry Gallawa
Officer Stephanie Meadows
Detective George Gray
Melissa Ohlhorst

Denver Police Department, District 2

Commander Mike Calo
Lt. Adriel Torres
Lt. Robert Garcia
Lt. Angelo Martinelli
Geneta Mohan

North Denver Cornerstone Collaborative

Kelly Leid, *Executive Director*
Celia VanDerLoop
Erika Reyes Martinez

Denver Public Health

Emily McCormick
Kathryn DeYoung

LiveWell Globeville Elyria Swansea

Rachel Cleaves, *Community Coordinator*

Groundwork Denver

Wendy Hawthorne, *Executive Director*
Tangier Barnes

Clínica Tepayac

Jim Garcia, *Executive Director*
Flossie O'Leary

Focus Points Family Resource Center

Steven Moss, *Executive Director*

CREA Results

Fernando Pineda-Reyes, *Executive Director*

Spanish Translation and Interpretation

Indira Guzman-Sais
Nohra Medina

Lead Consultant

Human Impact Partners:

Sara Satinsky
Holly Avey

Contributing Consultants

Mined Insights
one2one creative
Third Eye Editing & Research

This project was supported through funding from the North Denver Cornerstone Collaborative, an initiative of Mayor Michael B. Hancock.

This HIA is dedicated to the people of Globeville and Elyria Swansea for their commitment to a healthier community.

Acronyms Used

Denver Agencies

CPD	Community Planning and Development
CW Montero	Office of Councilwoman Judy H. Montero
DEH	Department of Environmental Health
DPD	Denver Police Department
NDCC	North Denver Cornerstone Collaborative
OED	Office of Economic Development
Parks	Parks and Recreation
PW	Department of Public Works

Other Acronyms

AHA	American Heart Association
ASARCO	American Smelting and Refining Company
CAG	Citizens Advisory Group
CDC	Centers for Disease Control
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CPTED	Crime Prevention Through Environmental Design
CSA	community supported agriculture
CSU	Colorado State University
DUG	Denver Urban Gardens
EPA	United States Environmental Protection Agency
FHWA	Federal Highway Administration
HIA	Health Impact Assessment
HVAC	heating, ventilation and air conditioning
IOM	Institutes of Medicine
NAAQS	National Ambient Air Quality Standard
NEMPPA	Northeast Metro Pollution Prevention Alliance
NGOs	non-governmental organizations
NWC	National Western Center
OU	Operable Unit
RPS	Renewable Portfolio Standard
RTD	Regional Transportation District
SNAP	Supplemental Nutrition Assistance Program
VB / I-70	Vasquez Boulevard / I-70 Superfund Site
WHO	World Health Organization



Table of Contents

Foreword 4

Executive Summary..... 5

SECTION 1

 Introduction..... 9

 About this Report..... 10

 About the Globeville and Elyria Swansea Neighborhood Planning Process 11

 Factors that Impact Health 11

 History and Environmental Justice Issues in the Globeville
 and Elyria Swansea Neighborhoods..... 12

SECTION 2

 Demographics and Health 14

SECTION 3

 Environmental Quality 19

SECTION 4

 Connectivity and Mobility 39

SECTION 5

 Access to Goods and Services..... 45

SECTION 6

 Community Safety 53

SECTION 7

 Mental Wellbeing..... 60

SECTION 8

 Recommendations..... 64

SECTION 9

 Reporting 69

 Monitoring and Evaluation Plan 69

 Conclusion and Next Steps 70

 Methodology and Limitations 70

APPENDICES

Can be viewed at www.behealthydenver.org

From the Executive Director



The Department of Environmental Health is proud to partner with other City agencies and local stakeholders to present this Health Impact Assessment as part of the overall analysis and planning for improvements in the neighborhoods.

To say that Globeville and Elyria Swansea are at the precipice of change would be an understatement. At no time since the construction of the I-25/I-70 interchange have these neighborhoods faced such a significant amount of upcoming redevelopment, which will come mostly from the reconstruction of I-70, changes at the National Western complex and installation of transit rail lines.

These changes provide an opportunity for the area to access new resources and develop better transportation connections. The Neighborhood Plans being created for the area will help guide future activities to take advantage of these opportunities.

Part of the planning for improving the quality of life in the neighborhoods involves improving the health of the residents in these communities. These residents face many health challenges associated with their proximity to industrial and transportation uses as well as their particular demographics.

We hope that the insights and recommendations in this report, which were developed after considerable neighborhood outreach and consultation with many interested people, will help the residents of Globeville and Elyria Swansea attain the quality of health and quality of life that they deserve.

Doug Linkhart, Executive Director, Environmental Health Department

From Councilwoman Montero



Globeville, Elyria and Swansea are among Denver's most notable and historic neighborhoods. Built on the foundations of industry, there are few other areas in our city that offer such diversity and opportunity to preserve and learn from the past while planning for a better future.

I have long held to the belief that the health and wellbeing of our residents should be at the heart of the planning process. For this reason, I have advocated for the use of Health Impact Assessment as a tool to ensure that we are building environments that put residents' health as our first priority.

I am excited to be able to partner with Denver Environmental Health and others to release this report which identifies opportunities as well as challenges that impact the residents of these neighborhoods. As this area is seeing significant investment and transformation as part of the North Denver Cornerstone Collaborative, I believe we can work together to ensure these issues are fully addressed and mitigated.

Moving forward, I see a return to the sustainable healthy neighborhoods that these communities once were; where you can walk to get fresh produce, milk and eggs; go to work just down the street; or walk your children to school.

As preserving and celebrating cultural diversity plays an integral role in a community, I believe it is critical to ensure the neighborhoods that have been home to rich cultures of first generation immigrants throughout history are maintained. Today, the population of mostly Latino families has created a beautiful urban-Latino local culture. This unique character can be enhanced by adding amenities to the neighborhood environment that are culturally appropriate and will make all residents feel comfortable, safe and healthy.

It is important that we all utilize this Health Impact Assessment in our progress forward and in guiding our actions to benefit the health of the community and its bright future.

Judy H. Montero, Councilwoman, District 9, Denver City Council

Executive Summary

How Neighborhood Planning is Related to Health in Globeville and Elyria Swansea

Globeville and Elyria Swansea are two of Denver's oldest neighborhoods, settled in the 1880s by Central and Eastern European ethnic communities who came for jobs in the railroad yards and heavy industries such as metals smelting. Over time, the neighborhoods continued to attract large industrial operations, which provided jobs but also produced decades of negative environmental impacts on air quality, water, and soil. The construction of Interstates 70 and 25 in the 1960s restricted physical access to the neighborhoods and produced more vehicular air pollution. At the time, little consideration was given to the health problems associated with such development.

Today, the community of 10,000 residents regularly experiences noise, odors, and periodic poor air quality from industrial operations, heavy truck traffic, freight trains and highways. The residents, the majority of whom are Hispanic families with young children, suffer from some of the highest rates of cardiovascular disease, diabetes, obesity, and asthma in the City. These chronic diseases are associated with poor diet and lack of exercise, among other factors, which are shaped by a deficient pedestrian and bicycle infrastructure and a lack of sources for healthy and affordable food. Opportunities for outdoor physical activity are also limited in the neighborhoods due to disconnected streets and sidewalks, lack of nearby goods and services, and concerns about crime and safety.

The **built environment** – those settings and surroundings designed and maintained by human efforts, including homes, schools, businesses, parks, roadways and transit systems – has the potential to be improved through the new Neighborhood Plans for each community. The Neighborhood Plans are being created with the City Planning Department's sponsorship and resident guidance and input, and are intended to represent the community's vision for future development. Upon adoption by City Council, these Neighborhood Plans will be the first ever for Elyria Swansea and the first in 25 years for Globeville.

This report recommends ways to inform and strengthen the goals of the Neighborhood Plans that have the potential to improve residents' health.

Defining Health Has Changed

In recent years there has been a growing understanding of the connection between how communities are designed and the impact on human health. Health is defined as *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."*¹ Research shows a strong relationship between the built environment and physical activity and nutrition. Environments that do not provide people with choices that support healthy lifestyles can contribute to chronic diseases such as diabetes, cardiovascular disease, and obesity. Well-designed neighborhoods can improve health, and poorly-designed communities can harm health.²

Connecting Health to Public Policy

In response to this awareness of the connection between community design and health, District 9 Councilwoman Judy Montero led the Denver City Council in prioritizing health considerations for neighborhood planning in its 2014 Priorities,³ including use of "Health Impact Assessment (HIA)" in all Neighborhood Plans. This HIA for the Globeville and Elyria Swansea Neighborhood Plans is the first to be conducted under this City Council directive.

An Opportunity of a Generation

Globeville and Elyria Swansea are in North Denver, which is currently undergoing several multi-million dollar infrastructure and redevelopment projects being coordinated under the North Denver Cornerstone Collaborative. These include the reconstruction of Interstate 70, improvement of City gateway corridors and the South Platte River greenway, and three new transit rail lines. In addition, the National Western Stock Show, a century-old annual livestock event, is redeveloping its 100-acre complex in Elyria Swansea into a year-round destination centered on education, economic development, tourism and entertainment. These projects present a historic, once-in-a-generation opportunity to rebuild a connected, healthy community for all people.

While this HIA focuses solely on the Neighborhood Plans and does not examine specific development projects, it is designed to set the stage for other projects by expressing the residents' vision for a future community that supports healthy living.

Executive Summary continued

What is a Health Impact Assessment?

A **Health Impact Assessment (HIA)** is a process to incorporate health considerations into a plan, project or policy. It provides a framework for collaboration among interdisciplinary partners to better understand how environmental, physical, economic, and social conditions determine health in order to inform public policy and decision making. This is particularly important now in Globeville and Elyria Swansea, as redevelopment will reshape the built environment for decades to come.

Factors that Impact Health

The health of an individual or population is only partly determined by genetics. The environment in which one lives – including housing, parks, schools, transportation, access to health care, environmental quality, jobs, healthy food, and the resulting daily choices that are available – all have a far greater impact on one’s health.⁴ **Health inequality** results when factors outside of individual genetics and personal choice affect peoples’ health.

Through resident participation in the neighborhood planning and HIA processes, five major health factors were identified as top concerns and were analyzed in this HIA:

- Environmental quality
- Connectivity and mobility
- Access to goods and services
- Community safety
- Mental wellbeing.

Key Findings

The HIA process revealed the following key findings about the major conditions that impact health in Globeville and Elyria Swansea:

Environmental Quality

- Highway traffic is the main source of air pollution in the communities. Although average air pollution is not higher than in other areas of Denver, there are periodic noticeable spikes in poor air quality.
- Odors emitted from industrial operations sometimes cause short-term health effects such as watering eyes or throat irritation, and longer-term quality of life impacts such as limited ability to exercise outdoors.
- Highway traffic, freight trains, and industrial plants emit noise at levels that sometimes exceed recommended federal thresholds and can cause residents stress and interfere with daily activities.

- The neighborhoods have undergone two large soil cleanup projects in the last several decades. Cleanup activities have largely been completed, yet misperceptions remain.
- The scarcity of trees and green infrastructure in the neighborhoods further reduces the capacity to improve air and water quality.

Connectivity and Mobility

- Getting around and through the neighborhoods is challenging due to disconnected roads, multiple railroad tracks, and other physical barriers which isolate residents within their neighborhoods and from other places. This environment also limits opportunities for physical activity including walking.
- Heavy freight trucks regularly travel on residential streets, serving industrial businesses that are located within the neighborhoods. Residents have long raised concerns about the danger posed to pedestrians by the close proximity of trucks, particularly to children walking to school.
- Half of the public streets do not have sidewalks. Many bus stops lack benches or even a safe place to stand, and the bicycle infrastructure is deficient as well.
- Fewer residents own vehicles in these communities than in Denver overall, and must rely on the multi-modal infrastructure for transportation. Four new transit rail stations will be opening soon, and the connections within the neighborhoods to these new stations by foot, bicycle or bus are currently unclear.

Access to Goods and Services

- There is no grocery store in this community of 10,000 people. Residents must travel further – in some cases twice as far as the average City resident – to shop for food for their families. Convenience stores do not offer affordable, nutritious foods or fresh produce for meal preparation at home.
- There are few retail stores or local services in the neighborhoods. Residents must travel outside of the area to take care of daily needs such as shopping, pharmacies, health care, child care, banking, and other services. This leads to increased driving, decreased walking, fewer social interactions and “eyes on the street.”
- While recreation facilities in both neighborhoods exceed the City’s minimum ratio per person, residents report concerns about safety, amenities, and lack of programming that meets their needs, particularly for children and youth.

Community Safety

- An increase in vehicle crashes resulting in fatalities to pedestrians and cyclists in recent years raises significant concerns about unsafe conditions at some intersections.
- There is a difference between reported crime rates and resident perceptions of crime. Property crime decreased significantly in both neighborhoods in early 2014 from the previous year, yet fear of crime remains high. Some crime may go unreported due to unwillingness of residents to interact with law enforcement.
- Street lighting in both neighborhoods is inadequate and less than in other City neighborhoods. Most residents do not use porch lights at night, which adds to the general feeling of darkness and unsafe conditions.
- The presence of graffiti, illicit activities and stray animals leads to safety concerns.

Mental Wellbeing

- Residents feel anxious and stressed in their daily lives due to the daily impacts of strong odors and loud noise generated by industries and trains.
- Trains crossing streets often cause lengthy delays for vehicles and pedestrians, impeding residents' ability to get to their destinations on time.
- Concerns about safety restrict residents' movements and limit their ability to gain mental health benefits from use of the parks and the river trail.
- Perceptions and fears about pollution linger despite substantial environmental cleanup activities. Lack of outreach in Spanish leads to continued misperceptions among residents who only speak Spanish.
- The pending I-70 reconstruction and other large redevelopment projects in the neighborhoods add to residents' stress, since many impacts of construction are still unknown.

How the Neighborhood Plans Can Affect Health

Increased separation or buffering between industrial and residential uses is needed to mitigate the impacts of industrial operations including poor air quality, noise and odors. Without buffering or other means to reduce impacts, residents will continue to experience the negative effects of their proximity to industry.

Noise will likely stay at existing levels or increase as growth occurs, unless active measures are taken to reduce current and future sources of noise including highways, trains, industry, and trucks. Long-term exposure to excessive noise can affect sleep and student learning, and lead to an increased risk of high blood pressure and cardiovascular disease.

A connected, orderly street network is necessary for efficient and safe travel throughout the neighborhoods, including access to jobs and schools. Streets must offer multi-modal elements including sidewalks, bike facilities, and connections to transit in order to support a safe pedestrian environment and access to physical activity as part of daily life.

Increasing the number of retail shops and necessary services to the neighborhoods can increase walking, decrease driving, and increase social interaction. Making parks and trails more accessible and safe can increase physical activity, reduce chronic disease risk factors, and improve mental wellbeing.

Recommendations

The Neighborhood Plans can contribute to improved health for residents through the following actions:

Environmental Quality

- Minimize negative impacts of industrial uses upon residential neighborhoods through land use designation, buffering or other means
- Reduce the impacts from trucks
- Address odor impacts from marijuana grow facilities
- Reduce noise impacts from current roadways
- Require mitigation of noise impacts from future highways
- Explore creation of "quiet zones" for trains
- Increase urban tree canopy and green infrastructure to improve air and water quality
- Review upcoming redevelopment projects to minimize negative environmental impacts

Connectivity and Mobility

- Build and improve streets that include multimodal elements ("Complete Streets")
- Connect existing streets where recommended
- Build connections to parks, trails, and green space
- Improve existing "school zones" on streets for student safety
- Connect to and through the redeveloped National Western Center

Executive Summary continued

Access to Goods and Services

- Create appropriate locations for and connections to local stores and services
- Incentivize development of new neighborhood retail, including a grocery store
- Develop access to healthy foods in the National Western Center
- Incentivize provision of healthy foods in existing neighborhood food stores
- Develop a flexible market space that can support culturally relevant activities

Community Safety

- Reduce vehicles crashes and fatalities at key intersections
- Improve street lighting
- Enforce City regulations regarding graffiti, vandalism, stray animals and property maintenance

Mental Wellbeing

- Address the factors in the physical environment that contribute to stress, anxiety and poor mental wellbeing
- Strengthen bilingual communication and outreach regarding the upcoming I-70 reconstruction and other major redevelopment projects

Next Steps

The information and recommendations in this HIA are being incorporated into each of the Neighborhood Plans for Globeville and Elyria Swansea. The Neighborhood Plans are anticipated to be adopted by the Denver City Council in 2014 and 2015.

The findings and recommendations in this HIA are designed to be used to inform specific projects, plans, or policies in Globeville and Elyria Swansea, both currently and in the future. Stakeholders including City departments, other agencies, local nonprofits, community groups and residents can work independently or together to implement the various recommendations; indeed, some activities are already underway. Implementation of these HIA recommendations will likely result in community design that contributes to better health for current and future residents.

References & Endnotes

¹ Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948. <http://www.who.int/about/definition/en/print.html>.

² National Association of County and City Health Officials (2002). NACCHO Statement of Policy: Healthy Community Design. Accessed at <http://www.naccho.org/advocacy/positions/upload/03-02-Healthy-Community-Design.pdf>.

³ Denver City Council (2013). Denver City Council Sets Priorities for 2014. Press Release, May 9. Accessed at: <https://www.denvergov.org/Portals/695/documents/PRESS%20RELEASE%20City%20Council%202014%20Budget%20Priorities.pdf>

⁴ North Carolina Institute of Medicine (2009). Socioeconomic Determinants of Health; in Prevention for the Health of North Carolina: Prevention Action Plan. October, 243-271. Accessed at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/Prevention-Chpt11.pdf>.

Introduction

In recent years there has been a growing understanding of the connection between how our communities are designed and our health. Health is defined as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”¹

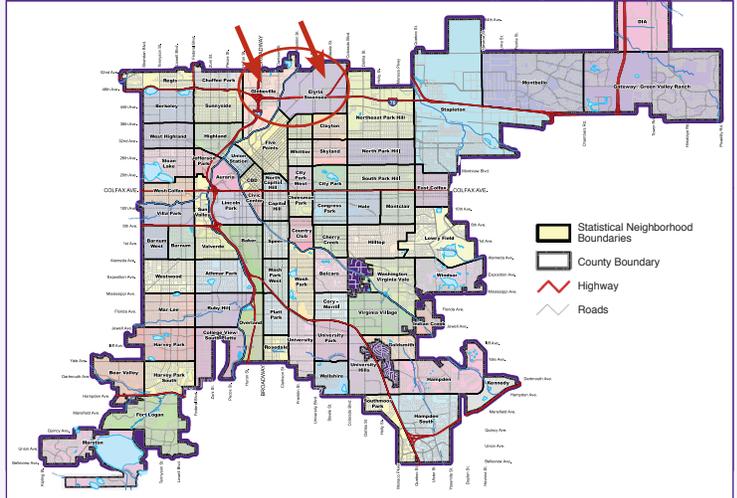
Research has revealed a strong relationship between our physical environment and a wide spectrum of health issues connected to physical activity, including chronic diseases such as diabetes, cardiovascular disease, and obesity. The way we design and build our neighborhoods determines how we live, work, eat, visit, walk, shop, worship and play. Well-designed neighborhoods can improve our health, and poorly-designed communities can harm our health.²

In response to this awareness, Councilwoman Judy Montero (representing District 9 including Globeville and Elyria Swansea in North Denver) led the Denver City Council in prioritizing health considerations for neighborhood planning in its 2014 Priorities,³ including use of “Health Impact Assessment (HIA)” in all Neighborhood Plans. (For more on Health Impact Assessment, see “About This Report”). This Health Impact Assessment for the Globeville and Elyria Swansea Neighborhood Plans is the first such HIA to be conducted under this City directive.

In 2012, the City of Denver–Community Planning and Development Department (CPD) began a neighborhood planning process with the Globeville and

*“Sacred Melting Pot”, Anthony Garcia,
Photo credit: Birdseed Collective*

FIGURE 1:
Globeville and Elyria Swansea Neighborhoods in Denver



Elyria Swansea communities. Globeville and Elyria Swansea are among Denver’s oldest neighborhoods, established in the 1880s around the railroads. The neighborhoods still have a number of historic churches and homes built by the Central and Eastern European ethnic communities that originally settled the area. Today the neighborhoods are characterized by a strong Hispanic culture and influence, with many families with young children.

The City of Denver currently has several major redevelopment and infrastructure projects taking place in the area (the “North Denver Cornerstone Collaborative”), including construction of transit rail, reconstruction of an interstate highway, and convention and tourism attractions. The Neighborhood Plans provide a unique and historic opportunity to envision a rebuilt, connected community, with a new gateway to downtown Denver and improved amenities and quality of life for residents.

This HIA looks at how neighborhood planning in Globeville and Elyria Swansea can positively impact residents’ health. The Neighborhood Plans will shape how the community looks in the next 5 to 10 years. The “Recommendations” in this HIA are designed to inform and strengthen the “Recommendations” of the Neighborhood Plans, by adding community health as a consideration for the future vision, design and development of the neighborhoods.

This Health Impact Assessment for the Globeville and Elyria Swansea Neighborhood Plans is the first such HIA to be conducted under the Denver City Council’s 2014 Priorities.



About this Report

The Denver Department of Environmental Health led this HIA process beginning in July 2013. The purpose was to inform the decision-making process of Neighborhood Planning, which is expected to conclude in late 2014 and early 2015 with City-adopted Neighborhood Plans.

The HIA was done in collaboration with residents, City staff, and local nonprofit organizations. The scope of the report was determined through input from residents at public meetings during the neighborhood planning process, and from a wide range of community members surveyed by local nonprofit organizations that are engaged in environmental and health promotion.

This report addresses the following five priorities:

- Environmental quality
- Connectivity and mobility
- Access to goods and services
- Community safety
- Mental wellbeing

The City's HIA staff was invited to participate in the Neighborhood Plan steering committee meetings and public meetings. Resident groups, community organizations and City of Denver agencies provided input to the Globeville and Elyria Swansea HIA throughout each phase of the process, including over a dozen public and steering committee meetings for the neighborhood planning process, and 10 surveys and studies completed before this HIA commenced. Also, the HIA team collected primary data from residents with a survey on safety and stress, and hired a qualitative researcher to augment community input by conducting detailed interviews with community service providers who work in the areas of health services, health promotion, education, and public safety. A detailed list of community engagement and survey data used can be found in the Appendices.

A Health Impact Assessment (HIA) is a process to incorporate community health considerations into a plan, project or policy. HIA provides a framework for collaboration among interdisciplinary partners to better understand how environmental, physical,

economic, and social conditions determine health. It aims to bring a greater understanding of human health consequences to public policy and decision-making, and strives to achieve the following principles:

Democracy – involve and engage the public while informing and influencing decision-makers;

Equity – consider the potential uneven health impacts on vulnerable groups of people;

Sustainable development – judge the short-term and long-term impacts of the proposed plan to meet the needs of current and future residents;

Ethical use of evidence – use unbiased evidence to judge impacts and inform recommendations; be rigorous and transparent.

Comprehensive approach to health – emphasize that health is determined by a wide array of factors in environment and society.⁴

An HIA assesses the potential effects a proposed plan, policy, or project can have on health, and makes recommendations to maximize health benefits and minimize negative effects. HIA uses a six-step process:

1. **Screening:** Determine whether an HIA will add value to the decision-making process.
2. **Scoping:** Identify key issues (“health determinants”) that can impact the plan, policy or project alternatives.
3. **Assessment:** Analyze baseline conditions and predict health impacts based on existing data, empirical research, expert and local knowledge.
4. **Recommendations:** Develop practical solutions that can be implemented within the limitations of the plan or project, to maximize health benefits.
5. **Reporting:** Disseminate the findings to decision makers, affected communities and other stakeholders.
6. **Monitoring and Evaluation:** Monitor the changes in health or health risk factors and evaluate the effectiveness of the measures that are implemented, and the HIA process as a whole.

Part of the HIA process is forming predictions about how the proposed plan will impact health, based on evidence and research studies. Predictions can be quantitative or qualitative depending on the data available. The predictions in this HIA are largely qualitative, and designed to help inform the decision points in the Neighborhood Plans since the HIA was conducted early enough during the neighborhood planning process. The predictions for each health factor can be found in Sections 3-7, in the “Predictions” subsections, and framed as to how the Neighborhood Plans can affect each factor.

When policymakers, project planners, community organizations, and advocacy groups participate in and have data from a Health Impact Assessment, decisions are better informed. Decision makers have the opportunity to provide the best outcome for communities, especially those facing health inequities.

About the Globeville and Elyria Swansea Neighborhood Planning Process

A neighborhood plan is a policy document that provides the vision and guidance for future development of a community over the next five to ten years, including current issues and potential opportunities. Many neighborhoods in Denver have Neighborhood Plans, or are updating their plans. The 2014 Neighborhood Plans for these two communities – the first ever for Elyria Swansea and the first in 25 years for Globeville – will consider previous assessments and plans, including the *2003 Elyria Swansea Neighborhood Assessment*, *2008 Globeville Assessment*, *Denver’s Comprehensive Plan 2000*, *Blueprint Denver 2002*, all adopted by the City of Denver, and the resident-led plan, *Elyria Vision Plan 2020*. Both neighborhoods worked with the City Planning staff to select a resident-led steering committee for each neighborhood, and

have met monthly since late 2012 to envision future development in each community. The Neighborhood Plans are expected to be completed in late 2014 to early 2015.

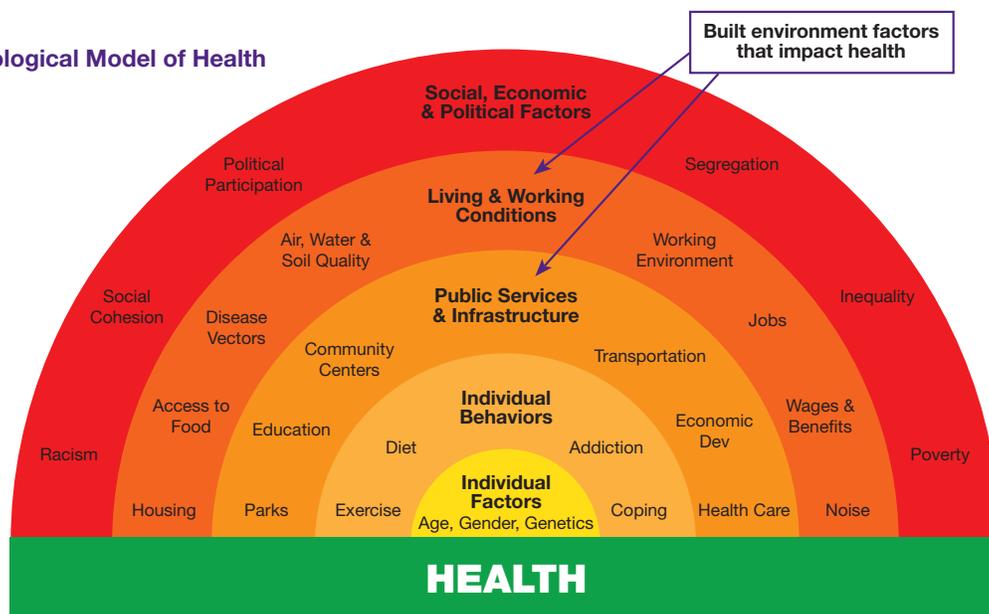
The Neighborhood Plans will address multi-modal connectivity, community safety and economic vibrancy, environmental and physical elements that can support health, and the unique history of the communities. At the start of the HIA process, the neighborhood steering committees had not identified specific elements to be addressed in the Neighborhood Plans. As the two processes ran concurrently, though, factors were identified that became priorities in both; for example, connectivity and community safety. This created the opportunity to form recommendations that addressed both neighborhood planning goals and health goals.

Factors that Impact Health

The health of an individual or population is only partly determined by genetics and behaviors. In fact, education and economic status are the strongest predictors of health in the U.S. People with higher incomes or personal wealth, more years of education, and who live in a healthy and safe environment have, on average, longer life expectancies and better overall health outcomes. Conversely, those with fewer years of education, lower incomes, less accumulated wealth, living in poorer neighborhoods, or substandard housing conditions have worse health outcomes.⁵

The recognition that physical, economic, and social factors have powerful effects on health means that improving public health requires going beyond treating illness and looking at the larger factors that impact health, including the built environment, a term used to describe all the settings and surroundings designed and maintained by human efforts, such as homes, schools, offices, parks, neighborhoods, roadways and transit systems.⁶

FIGURE 2:
A Socio-Ecological Model of Health



Resources that are distributed unevenly across communities contribute to health status that also varies widely across communities. In other words, where a person lives can have a dramatic effect on health.⁷

For example, the physical or built environment can present significant barriers to health-promoting behaviors. Some communities are not conducive to health because they bear a heavy burden of industry, traffic, or highways, causing noise, odors, air, or water pollution. Some do not encourage physical activity because they do not have safe places to walk or bike, attractive destinations, or a well-connected street network. Others have high levels of crime or low-quality schools that force parents to keep kids indoors, and limit access to education. Many such communities have limited access to essential goods and services, notably full-service grocery stores selling affordably priced fresh and healthy foods. When these physical and socio-economic determinants limit the opportunity of residents of a community to achieve their full

Health equity is “the fair and equal opportunity to lead healthy, productive lives regardless of race, ethnicity, income or where we live.”⁸ Some differences in health between neighborhoods can be traced to unequal physical, economic and social conditions and are systemic and avoidable.⁹

health potential, that community suffers from **health inequity**, or differences in health which result from factors which are considered to be both avoidable and unjust.

To address this inequity, it is necessary to approach public health from a collaborative and cross-disciplinary perspective. Public health practitioners across the United States are collaborating more closely with other government agencies to devise policies that promote improved health, including environmental quality, land use, transportation, education, employment, and housing policies.

History and Environmental Justice Issues in the Globeville and Elyria Swansea Neighborhoods

The towns of Elyria, Swansea and Globeville were established in the 1870s and 1880s. They were annexed into Denver by 1902. The towns grew up around the Kansas Pacific and Union Pacific railroads and the Globe smelter, established in 1886. The smelter processed the gold, silver, copper, and lead delivered from Colorado’s mountain mining communities. The smelter drew immigrants from all over the globe – hence its name. Polish, Slovenian, Russian Croatian, Serbian, Czechs, and Volga Germans were all recruited to come work the dangerous jobs at the smelter and at the adjoining rail yards. Later, Hispanic families came to work in industries such as the meatpacking operations that came afterward.¹⁰

Globeville and Elyria Swansea (as it is known today) were always physically isolated from the rest of Denver by the train tracks, large industrial sites, and the South Platte River. Later, the construction of two interstate highways through these neighborhoods further reduced connectivity and increased their isolation. Interstate 25 (I-25) was completed in 1958 and divided Globeville, significantly restricting east-west access. Interstate 70

(I-70) was completed in 1964, dividing Globeville again – the “mousetrap” intersection of these two interstates occupies the center of Globeville – and divided Elyria Swansea as well, restricting north-south connectivity in both neighborhoods.¹¹



A group of men pose with stacks of silver ingots processed at the Omaha and Grant Smelter in Globeville, circa 1890-1900. Credit: Western History/Genealogy Dept., Denver Public Library

While many of the impacts of the interstates were fairly obvious and immediate, the long-term impacts of smelting and other industries are not always readily apparent or easily comprehended. ASARCO (the American Smelting and Refining Company), bought the Globe smelter in 1901, and processed lead until 1919, when it began production of arsenic trioxide for use in insecticides, medicine, and glass. From 1926 until it closed in 2006, ASARCO produced cadmium for coating iron and steel.^{12, 13} In 1983, the State health department sued ASARCO for damages to natural resources, and in 1989 a class action lawsuit was filed on behalf of neighborhood residents asking, among other things, that contaminated soils be removed.

The U.S. Environmental Protection Agency (EPA) defines environmental justice as “the fair treatment and meaningful involvement of all people...with respect to the development and enforcement of environmental laws, regulations, and policies.”¹⁴ In other words, “no group of people should shoulder a disproportionate share of pollution.”¹⁵ The EPA considers Globeville and Elyria Swansea to be affected communities in terms of environmental justice. In addition to the two interstate highways, they are impacted by the ASARCO site, as well the Vasquez Boulevard/I-70 Superfund¹⁶ site, a four-square mile area also impacted by historical smelting activities. The clean up (remediation) activities on the historic smelter sites are nearly complete; the status of remediation is described in the section on Environmental Quality.

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.¹⁷ In the U.S., low-income and minority communities have historically been disproportionately exposed to environmental risks while receiving fewer benefits derived from the development of natural resources.

Health equity and environmental justice are both are rooted in a concern for just and equitable treatment and access to the benefits of society.¹⁸

Industry, highway development, and other attributes of the built environment have long disproportionately impacted the health of residents of the Globeville and Elyria Swansea neighborhoods. While the Superfund and I-70 activities have received much attention, and indeed significantly impact Globeville and Elyria Swansea, they are part of the larger picture of health and the built environment in the Globeville and Elyria Swansea neighborhoods, including demographics and health status.

References & Endnotes

- ¹ Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948. <http://www.who.int/about/definition/en/print.html>.
- ² National Association of County and City Health Officials (2002). NAC CHO Statement of Policy: Healthy Community Design. Accessed at <http://www.naccho.org/advocacy/positions/upload/03-02-Healthy-Community-Design.pdf>.
- ³ Denver City Council (2013). Denver City Council Sets Priorities for 2014. Press Release, May 9. Accessed at: <https://www.denvergov.org/Portals/695/documents/PRESS%20RELEASE%20City%20Council%202014%20Budget%20Priorities.pdf>
- ⁴ Human Impact Partners. FAQ about HIA. Accessed at: <http://www.humanimpact.org/new-to-hia/faq>
- ⁵ North Carolina Institute of Medicine (2009). Socioeconomic Determinants of Health; in Prevention for the Health of North Carolina: Prevention Action Plan. October, 243-271. Accessed at: <http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/Prevention-Chpt11.pdf>.
- ⁶ Dannenberg, A, Frumkin, H and R Jackson (2011). Making Healthy Places Washington, D.C., Island Press, p. 380.
- ⁷ Human Impact Partners. FAQ about HIA. Accessed at: <http://www.humanimpact.org/new-to-hia/faq>
- ⁸ The Colorado Trust. Accessed at: <http://www.coloradotrust.org/>
- ⁹ Braveman, Paula (2006). Health disparities and health equity: Concepts and measurement. Annual Review of Public Health, 27: 167-194. Accessed at: http://qplus.qmul.ac.uk/pluginfile.php/153515/mod_book/chapter/2994/Health%20Disparities%20P%20Braveman.pdf
- ¹⁰ Degette, Cara (2013). The grit of Globeville. Colorado Public News, January 21. Accessed at: <http://www.cpt12.org/news/index.php/the-grit-of-globeville>
- ¹¹ Ibid.
- ¹² US Environmental Protection Agency (2013). Vasquez Boulevard and I-70. Webpage. USEPA, Region 8, Denver, CO. Accessed at: <http://www2.epa.gov/region8/vasquez-boulevard-i-70>
- ¹³ US Environmental Protection Agency (2010). ASARCO, Inc. (Globe Plant). Webpage. USEPA, Region 8, Denver, CO. Updated July 2010. Accessed at: <http://www2.epa.gov/region8/asarco-inc-globe-plant>
- ¹⁴ U.S. Environmental Protection Agency Office of Environmental Justice (2014). Environmental Justice Collaborative Problem-Solving Cooperative Agreement Program, March 6, p. 3. Accessed at: <http://www.epa.gov/compliance/environmentaljustice/resources/publications/grants/ej-cps-rfp-2014.pdf>.
- ¹⁵ U.S. Environmental Protection Agency Region 8. Environmental Justice Training. Accessed at: <http://www2.epa.gov/region8/environmental-justice-training>
- ¹⁶ U.S. Environmental Protection Agency. Superfund: Cleaning up the Nation's Hazardous Waste Sites. Accessed at: www.epa.gov/superfund.
- ¹⁷ U.S. Environmental Protection Agency Region 8. Environmental Justice Training. Accessed at: <http://www2.epa.gov/region8/environmental-justice-training>
- ¹⁸ U.S. Department of Health and Human Services. Accessed at: <http://www.hhs.gov/environmentaljustice/strategy.html>.

Demographics and Health in Globeville and Elyria Swansea Today

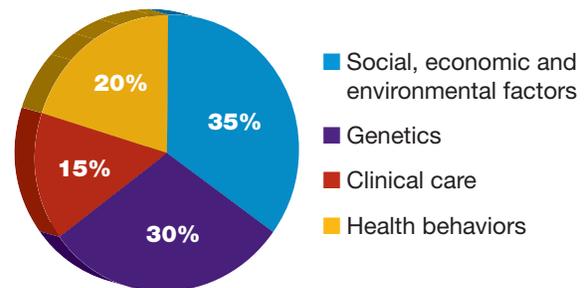
Summary of Key Findings

Socioeconomic factors such as income, education, race and ethnicity all influence health. Limitations in access to education and the effects this has on employment and economic opportunities can pose challenges for residents to maintain good health. Residents of both neighborhoods are predominantly Hispanic, and when compared to Denver overall are younger, have less income, and less education.

Residents of Globeville and Elyria Swansea also experience a higher incidence of chronic health conditions such as cardiovascular disease, diabetes, obesity, and asthma than other Denver neighborhoods. Children and other vulnerable populations can be susceptible to chronic health conditions, and these communities have larger numbers of families with children compared to other neighborhoods.

To understand community health today in Globeville and Elyria Swansea, it is important first to understand the demographic makeup of the neighborhoods because factors like income, education, race, and ethnicity all link to health. Research shows that individual genetics only account for about 30% of one's health status, and about 70% of one's health is attributable to the physical environment, access to health care, socioeconomic factors including education, income, employment, and community safety, and individual health behaviors such as tobacco use, diet and exercise, and alcohol use.¹ (Figure 3)

FIGURE 3:
Determinants of Individual Health¹



SOURCE: Human Impact Partners 2013

Demographics

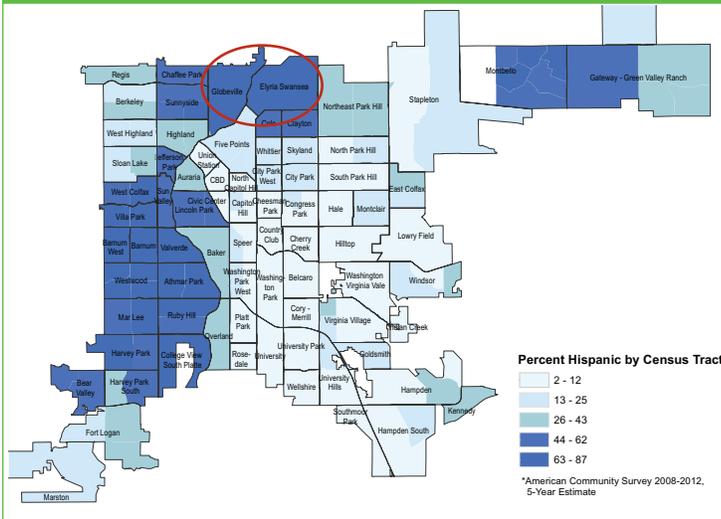
Both Globeville and Elyria Swansea have populations that are predominantly Hispanic in ethnicity. In fact, Elyria Swansea has one of the highest Hispanic populations of any neighborhood in Denver at 84%, compared with Denver at about 32% (Figure 4). Globeville's population is about 68% Hispanic. Both neighborhoods also have a much younger population, and more families with children (43% in Globeville, 55% in Elyria Swansea) than in Denver (25% overall).

The household income in Elyria Swansea is \$44,700, and in Globeville is \$39,200, both significantly lower than Denver's average of \$73,100.²

Also, residents have achieved lower education levels than the average in Denver, and experience more linguistic isolation (Spanish speaking only) than in Denver as a whole (Figure 5).

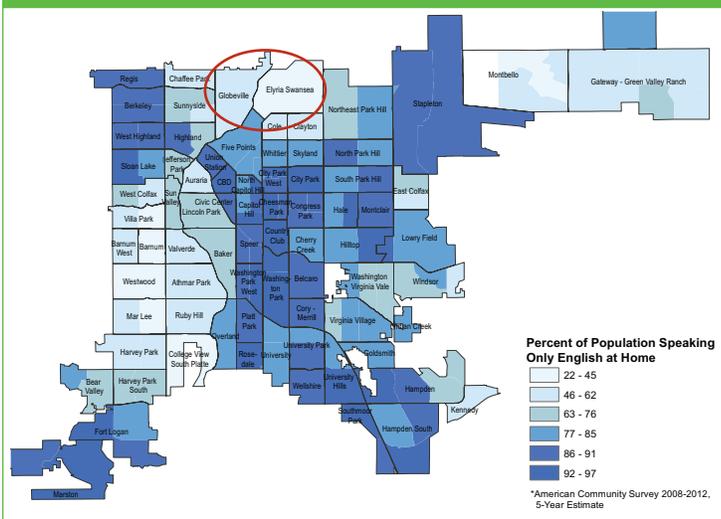
These demographic and socioeconomic characteristics pose challenges for Globeville and Elyria Swansea residents to maintain good health, through limitations in access to education, employment, and economic opportunities. Inequities in opportunity have been shown to lead to inequities in health, along the lines of race, ethnicity, income and education levels, among other variables.³

FIGURE 4:
Hispanic Population in Denver Neighborhoods



SOURCE: Denver Community Planning and Development 2014

FIGURE 5:
Percent Speaking Only English at Home in Denver Neighborhoods



SOURCE: Denver Department of Environmental Health 2014

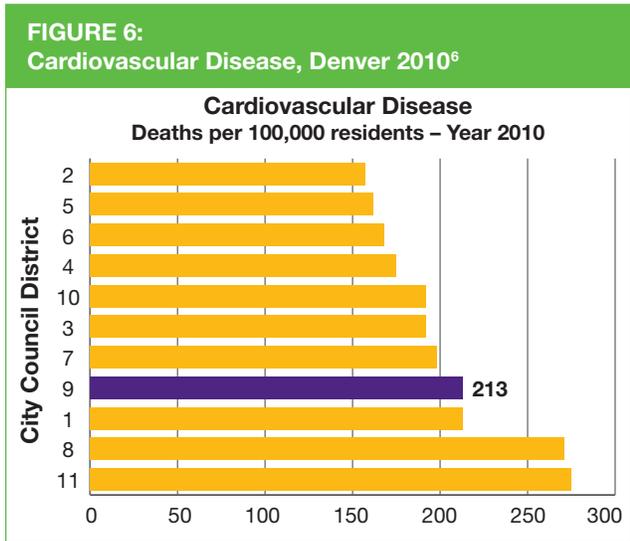


Globeville and Elyria Swansea are identified by the Piton Foundation as a “hub” in what is called “The Children’s Corridor,” a 14-mile long arc of neighborhoods where 54,000 children live, “roughly two-thirds of...[whom] face the hardships of poverty, underperforming schools, undereducated parents, poor nutrition, unsafe neighborhoods, or some combination of these”.⁴ The goal of the Children’s Corridor is to focus community resources, energy and ideas to improve health and opportunities for children in these neighborhoods. (See www.denverchildrenscorridor.org for more information.)

Health

The health conditions assessed in this HIA include cardiovascular disease, diabetes, obesity, asthma, and cancer. These conditions were selected for inclusion either because of their high prevalence in these neighborhoods or because of community concern.

Cardiovascular disease and cancer are the leading causes of death in Denver.⁵ Denver City Council District 9, which includes Globeville, Elyria Swansea and a number of other neighborhoods has one of the higher rates of cardiovascular disease in Denver overall.



SOURCE: Denver Public Health and Denver Department of Environmental Health 2012

Likewise, there is a higher incidence of diabetes in District 9 than many other parts of Denver.⁵

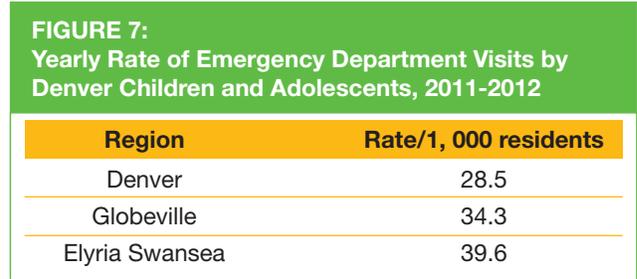
Obesity and overweight are important risk factors for cardiovascular disease and diabetes, as well as a host of other health problems. More than half of adults in Council District 9 are overweight or obese, also higher than in many other parts of the City.⁵

Physical activity is one of most important factors in reducing the risk of chronic disease. People who are physically active tend to live longer and have lower risk for heart disease, stroke, type 2 diabetes, depression, and some cancers. Physical activity can also help with weight control, and may improve academic achievement in students.⁷

One survey of adults in Globeville and Elyria Swansea showed that they were only about half as physically active as residents of Denver or Colorado overall.⁸

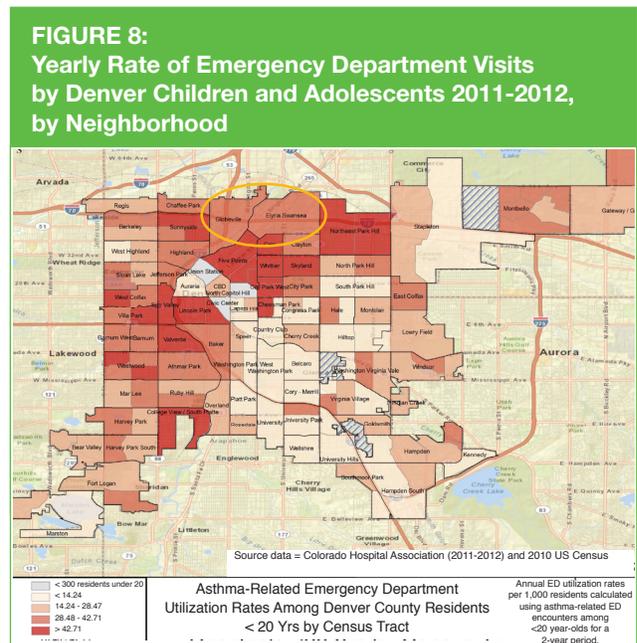
Children in both neighborhoods reported in a recent survey that they are physically active in both in school and outside of school, but the daily frequency and minutes per day in physical activity are lower than recommended guidelines of 60 minutes or more per day.⁹ Over one-third of children are either overweight or obese, compared to less than one-third in Denver overall.¹⁰

Respiratory diseases and illnesses such as asthma can greatly impair a child’s ability to function and are an important cause of missed school days and limitations of activities, as well as a large cost burden to families and society.¹¹ The children and youth of Globeville and Elyria Swansea visit emergency rooms for asthma-related treatment more often than their counterparts in Denver as a whole (Figure 7):



SOURCE: Denver Public Health 2014

Geographically, some northern and western Denver neighborhoods have higher emergency room rates for youth asthma-related events than others,¹² with higher than average rates observed around the I-70 corridor and the junction of I-70 and I-25 (Figure 8). These neighborhoods are also predominantly Hispanic, African-American, and lower-income. (See Figure 4)



SOURCE: Denver Public Health 2014

These kinds of asthma health disparities have been seen before and researchers suspect they are caused by factors like differences in primary care access, disease management, and exposure to asthma triggers, including indoor and outdoor air pollution.¹³ Studies in other regions have found a link between living close to a highway and problems with asthma. One question is whether children and adolescents who live near highways may have more problems with asthma because of vehicle exhaust. Denver Public Health and Denver Environmental Health plan to look more closely at this relationship in the next year.

Statistics on cancer in Globeville and Elyria Swansea have been collected, including a study conducted in 2003 in response to citizen requests after elevated levels of arsenic and lead had been measured in area soils at one of the remediation sites.¹⁴ The 2003 report showed

a higher than expected number of cancer cases for several types of cancer in this area. However, the study “does not make detailed examinations of individual cases and does not allow conclusions to be made about causal association between exposure and any single cancer or group of cancers.”¹⁵ In other words, it could not directly link community-level environmental exposures to cancer risk, as it is not known how other factors such as individual smoking status, alcohol use, family history, length of time lived in the neighborhood, occupation, etc., could have come into play.¹⁶ These would all be important considerations in further evaluating the full risk of cancer in the area and to minimize the influence of factors other than the environmental exposures that are potentially unique to the Globeville and Elyria Swansea neighborhoods.

Neighborhood Planning and Health

Neighborhood planning impacts health by affecting the community determinants of health – the physical, social, economic factors that influence wellbeing, such as air quality, housing, jobs, access to healthy food, access to parks, and transportation. Lack of access to these elements all have been shown to negatively affect health.¹⁷

The pathway diagrams below (*Figures 9 and 10*) were developed at the beginning of this HIA to show

potential relationships between how proposed changes in the neighborhoods could affect health. They indicate that if certain land use and design changes are made in Globeville and Elyria Swansea, these may be followed by immediate, intermediate, and long-term outcomes, which have been shown to change health in certain positive ways.

FIGURE 9:
Pathways Between Environmental Quality and Health

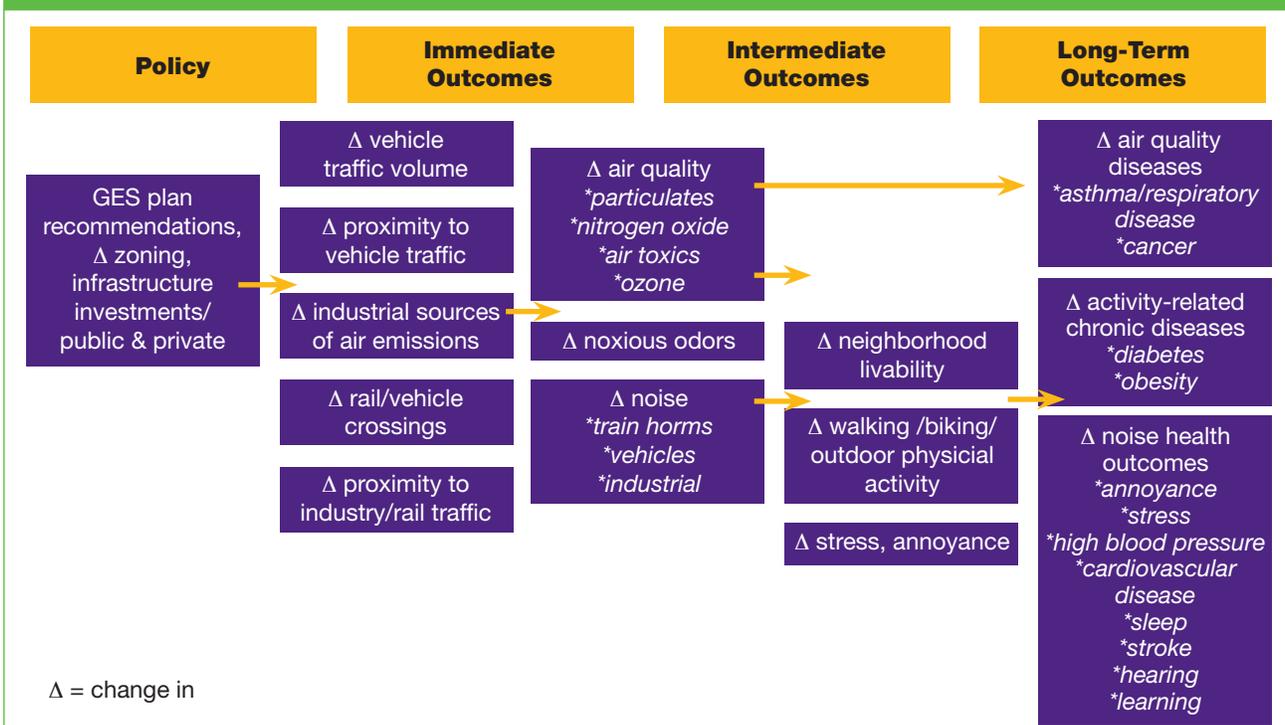
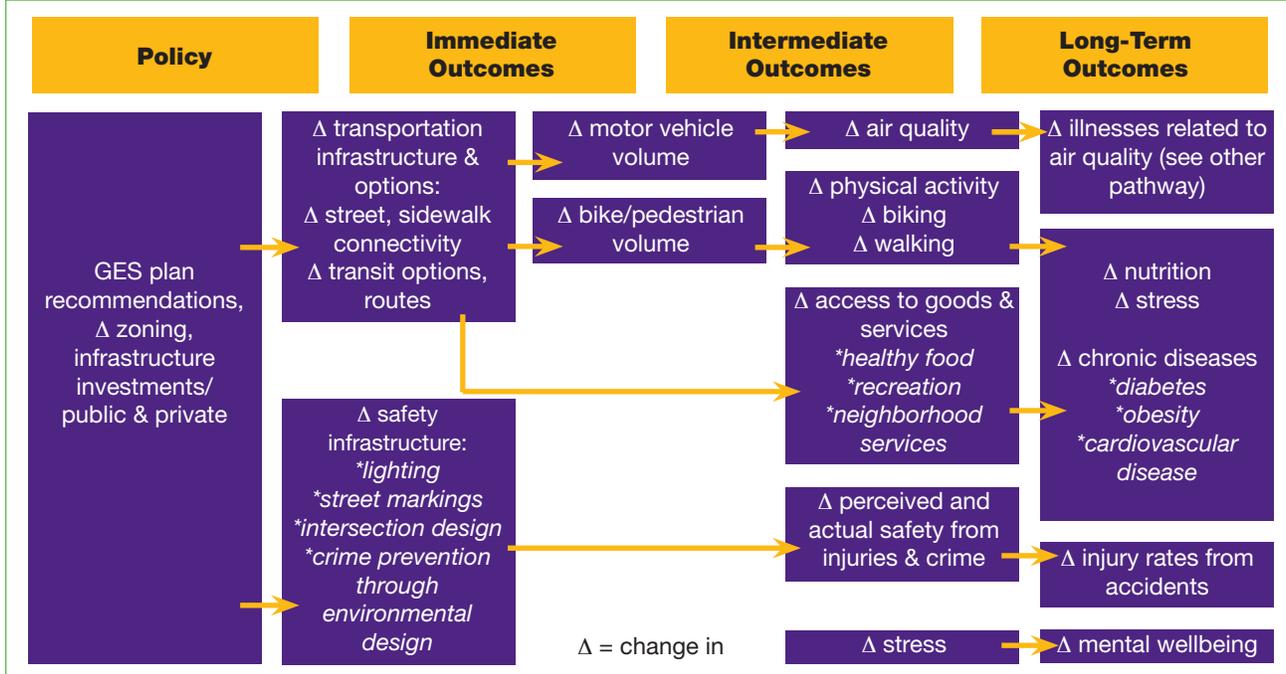


FIGURE 10:
Pathways Between Access, Connectivity, Safety and Wellbeing and Health



SOURCE: Denver Department of Environmental Health 2014

References & Endnotes

- Human Impact Partners (2013). Roadmaps to Health: New Partnerships for Health in All Policies Accessed at: http://www.healthpolicyohio.org/pdfs/hia_training_slides_ohio.pdf From: Booske, B, Athens, J, Kindig, D, Park, H and P Remington (2010). Different Perspectives for Assigning Weights to Determinants of Health. February. <http://uwphi.pophealth.wisc.edu/publications/other/different-perspectives-for-assigning-weights-to-determinants-of-health.pdf>
- American Community Survey 2012. Accessed at: <http://www.census.gov/acs/www/>
- Bell, J and M Lee (2011). Why Place and Race Matter, Oakland, CA, PolicyLink. Accessed at: http://www.policylink.org/sites/default/files/WPRM_EXEC_SUM_LOW_RES.PDF
- Piton Foundation (2012). The Children's Corridor. Accessed at: <http://www.denverchildrenscorridor.org/about>
- Denver Public Health and Denver Environmental Health (2012). Health of Denver 2011: A report on the health status of the residents of Denver, Colorado. <http://www.denvergov.org/behealthydenver/BeHealthyDenver/Reports/tabid/443365/Default.aspx>
- Age adjusted mortality rate per 100,000.
- Centers for Disease Control and Prevention (2014). Facts about Physical Activity. Division of Nutrition, Physical Activity, and Obesity. Accessed at: <http://www.cdc.gov/physicalactivity/data/facts.html>
- Kaiser Permanente (2013). Globeville Elyria Swansea LiveWell Survey: Baseline results. Kaiser Permanente Institute for Health Research, Center for Community Health and Evaluation, Center for Weight and Health. Survey Date: November 2012, Report Date: July 2013.
- Group Health Research Institute and University of California Berkeley (2013). Healthy Eating Active Living, Youth Food and Physical Activity Survey: Baseline results for Garden Place Academy (Denver County). Center for Community Health and Evaluation and Atkins Center for Weight and Health. May.
- Group Health Research Institute and University of California Berkeley (2013). Healthy Eating Active Living, Youth Food and Physical Activity Survey: Baseline results for Swansea Elementary (GES County). Center for Community Health and Evaluation and Atkins Center for Weight and Health. June.
- Based on body mass index for students at Denver Public School attended (not residence address), for year 2012.
- Denver Office of Children's Affairs (2014). The status of Denver children. Accessed at: <http://www.denvergov.org/Portals/713/documents/2014%20Data--Lisa/Status%20of%20Denver's%20Children2014.pdf>
- U.S. Environmental Protection Agency (2011). Indicators—Health: Respiratory Diseases; in America's Children and the Environment, 3rd ed., March. Accessed at: http://www.epa.gov/ace3draft/draft_pdfs/ACE3RespiratoryDiseasesReviewPackage3-02-11.pdf
- Emergency room visits may include multiple visits by the same patient.
- DeYoung, K. (2014). Disparities Among Children and Adolescents Receiving Inpatient or Emergency Care for Asthma (Denver, Colorado 2004-2012) [abstract], Denver Public Health. Presentation at 2014 annual meeting of Council of State and Territorial Epidemiologist, Nashville TN. June 22-26. Accessed at: <https://cste.confex.com/cste/2014/webprogram/Paper3330.html>
- Colorado Department of Public Health and the Environment (2002). Cancer in North Denver, 1998-2000. Colorado Comprehensive Cancer Control Program. September.
- Colorado Department of Public Health and the Environment (2003). Analysis of diagnosed vs. expected cancer cases in residents of the Vasquez Boulevard/I-70 Superfund site study area. November.
- Colorado Department of Public Health and the Environment (2003). Analysis of diagnosed vs. expected cancer cases in residents of the Vasquez Boulevard/I-70 Superfund site study area. November.
- Byers, T. MD MPH (2014). Personal communication re: analysis of CDPHE cancer studies in the Globeville Elyria Swansea area. Associate Dean for Public Health Practice, Colorado School of Public Health, and Associate Director for Cancer Prevention and Control, University of Colorado Cancer Center. March 4.
- Humboldt County Public Health Branch, Humboldt Partnership for Active Living, and Human Impact Partners (2008). Humboldt County General Plan Update Health Impact Assessment: Summary, March, p. 2. Accessed at: <http://www.humanimpact.org/downloads/humboldt-general-plan-update-hia-summary/>

Environmental Quality

Summary of Key Findings

Environmental quality has been a concern in Globeville and Elyria Swansea for many years due to historic metal smelting, heavy industry, two highways, and railroad yards. These activities have impacted air quality, odors, noise, and water and soil quality. Key findings include:

- **Air quality:** The neighborhoods are close to sources of air pollution from vehicles on I-70 and I-25, which carry approximately 150,000 and 250,000 vehicles per day respectively, and are the main sources of air pollution. Stationary sources such as industrial plants also impact air quality. Although average annual air pollution in the neighborhoods is not higher than other areas of Denver, at times the neighborhoods experience spikes in poor air quality depending on location, time of day, and weather. Additionally, the entire Denver metro area – which includes the neighborhoods – currently does not meet standards for ozone.
- **Odors:** Unlike most other Denver neighborhoods, a majority of the land in Globeville and Elyria Swansea consists of industrial and commercial businesses – over 70% in each neighborhood compared with 35% in Denver overall. Some of these industries often produce unpleasant odors that can cause short term health effects and longer term quality of life impacts, such as the ability to engage in outdoor physical activity.
- **Noise:** There are many sources of noise in the neighborhoods in close proximity to Globeville and Elyria Swansea residences and some close to sensitive uses, such as Swansea Elementary School. Sources of noise include highway traffic, freight trains, and industrial operations. Sometimes these noise levels exceed recommended federal thresholds and can cause residents stress and interfere with daily activities, such as the ability to sleep and for children to learn.
- **Water quality:** The stretch of the South Platte River that runs through the neighborhoods is downstream of downtown Denver, and can have poor water quality due to polluted urban runoff – particularly for E. coli levels, which are often above state standards during warmer weather. Recreational activities are the main source of water contact, although occasional, and outreach is being done to educate against contact with the water.
- **Soil quality:** Due to the impacts of historic smelting activity, the area has undergone two large soil cleanup projects in the last several decades. Cleanup of residential properties has largely been completed.

How the Neighborhood Plans Can Improve Environmental Quality

Future neighborhood design can improve environmental quality by well-planned separation or other means to buffer industrial uses from residential and other sensitive uses. Without such buffering, historic conflicts between uses are likely to continue in the future, causing air quality and odor issues for residents. Continued and improved monitoring of environmental conditions is needed, as well as current and future mitigations to improve environmental quality including noise and odors. Partnership with the major redevelopment projects is critical to improve environmental quality in Globeville and Elyria Swansea.



Air Quality in Globeville and Elyria Swansea Today

Air pollution comes from a variety of sources.

Stationary sources include industries such as factories, power plants, refineries, and dry cleaners. **Mobile** sources include cars, buses, planes, trucks, and trains. Other naturally occurring sources in the arid West are windblown dust and wildland fires. Air quality can vary based on location, time of day, and weather.

In Denver, mobile sources are the main source of air pollution. Stationary sources may also be contributors. Air pollution is both a local and regional issue, because pollutants emitted in one location can impact air quality near the source as well as tens to thousands of miles downwind.

The construction of Interstates 70 and 25 across Globeville and Elyria Swansea in the 1960s brought many more vehicles (mobile sources) through the neighborhoods. In addition, the presence of the highways brought more industrial businesses into the community. Combined, the highways and industries resulted in increased public health risk due to decreased air quality.

Regulations designed to reduce air pollution have been successful in dramatically reducing air pollution in Denver and elsewhere since the 1980s.¹ Cleaner cars and trucks, cleaner fuels, reduced wood burning, and cleaner factories have been responsible for much progress, as well. During the same time, however, Denver has seen a significant increase in the City's population and in vehicle miles driven, which can contribute to air pollution.

How Air Quality is Measured

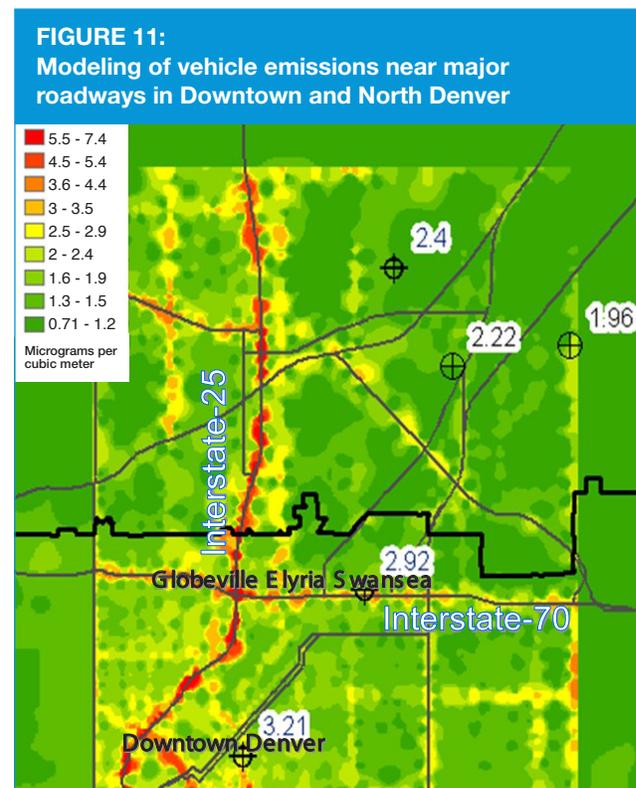
Air quality is measured in Denver through a combination of **monitoring** (measuring the contents of the air using instruments) and **modeling** (computer programs that use actual air quality measurements from some areas to predict air quality in other areas, and into the future). The City monitors air quality using regular monitoring with fixed monitors, as well as specialized monitoring at specific times and places. Pollutants that are regularly measured include fine particulate matter (small particles), ozone, carbon monoxide, and nitrogen oxides (all gases). For more information on how air quality is measured, see Appendices at www.denvergov.org/behealthydenver.

Air Quality in Denver Overall

Vehicle exhaust is the main source of air pollution in Denver. I-70 and I-25, which intersect in North Denver, carry 150,00² and 250,000³ vehicles per day, respectively. Within the Denver metro area, the highest concentrations of air pollution are near the downtown area (several miles south of Globeville and Elyria Swansea). Vehicle emissions are highest along I-25 near downtown, as is the traffic density within a one-mile radius of downtown Denver.

Lead and carbon monoxide concentrations in Denver have decreased significantly in recent years due to cleaner cars and trucks. Ozone, however, continues to be a problem both in Denver and in neighboring counties. Vehicles are a major contributor to ozone, and the Denver metro area is currently classified as not having met the federal standards for ozone.

Figure 11 below shows that air pollution is concentrated along I-25 and I-70, which go through North Denver, Downtown, and parts of Globeville and Elyria Swansea. This is based on modeling that uses one component of vehicle pollution. Globeville and Elyria Swansea are near the intersection of I-25 and I-70 just below the dark black line (the boundary of Denver) in the middle of the figure.



SOURCE: Denver Department of Environmental Health 2014

Air Quality in Globeville and Elyria Swansea

Overall, air quality in Globeville and Elyria Swansea is sometimes poor in particular areas or during what are known as “upset events” that are temporary but significant when they do happen. Details include:

- Air pollution from vehicles is highest near highways, but decreases rapidly within a few hundred feet of the highways.⁴ Within Globeville and Elyria Swansea, there are numerous homes within a few hundred feet of I-70 and I-25, as is Swansea Elementary School.
- Past studies have found slightly higher concentrations of certain solvent-related air pollutants in Elyria Swansea (e.g., benzene, toluene, ethylbenzene, xylenes) than at other air monitoring sites in metro Denver.⁵ This may be the result of the use of these solvents by commercial businesses in the area.⁶
- In North Denver, where Globeville and Elyria Swansea are located, stationary sources also affect air quality (including odors) in “upset events” that do not occur often and tend to be short-lived, but that can be significant when they do occur. For example, the Suncor refinery may have a planned “event” related to an industrial process and the community is normally notified in advance; or there may be emergency events such as flare-offs that occur occasionally and which temporarily affect air quality, particularly in terms of odors.
- The neighborhoods are among those with the lowest amount of tree cover in Denver, and lower than the City’s recommended minimum. Trees can improve air quality by absorbing carbon dioxide, carbon monoxide, and ground-level ozone, as well as producing oxygen.⁷ The inadequate tree canopy in the neighborhoods further magnifies the existing air quality impacts.

Is the air in Globeville and Elyria Swansea more polluted than other parts of Denver?

The average annual level of air pollution in Globeville and Elyria Swansea is not higher than other areas of metro Denver, for the air pollutants routinely measured. But North Denver neighborhoods are located closer to major sources of air pollution (e.g., refinery, powerplant, asphalt roofing manufacturer), and occasional spikes are noticeable and measurable. Residents have expressed concern about air quality, often due to strong odors in the air. One community member recently noted,

*“... contamination as well as the air pollution and odors from Purina and I-70 would be reasons that people would keep their children inside, not able to play. These also factor into the question about a safe place to exercise. People don’t want to walk or jog in impure air. A lot of residents said that they felt they could get cancer from the air...”*⁸

The perception of air pollution is often created by the presence of strong odors, which may or may not contain pollutants normally measured in outdoor air. (Odors are discussed in more detail in the following section).



Will air pollution get worse?

It is anticipated that air pollution will not get worse in Denver or in Globeville and Elyria Swansea. However, this will require a large ongoing effort from all stakeholders. In recent years, Denver has significantly reduced most types of air pollution. Our understanding of air pollution and health effects is also improving (both short- and long-term). Despite these improvements, ozone remains a regional problem even with reductions in pollutants that form ozone. Denver generally has lower ozone concentrations compared to sites in the suburbs, although it remains a problem in Denver, as well.

Most motor vehicles will continue to get cleaner as a result of recent and pending federal regulations. Statewide regulations such as the Renewable Portfolio Standard (RPS) and the Clean Air Clean Jobs Act will result in significantly cleaner electric generation over the next decade. As a result, further air pollution reductions are expected despite increasing population. The City and other agencies have begun several activities to improve air quality; see sidebar “Future activities to improve air quality in Denver.”

Future activities to improve air quality in Denver

During the end of 2014, the City's Department of Environmental Health (DEH) will update its modeling of air toxics using the most recent data available, from 2010-2011, and include forecasts for a future year such as 2025. This work should help to answer questions about the future of air pollution throughout Denver, especially after the build-out of several major transportation projects, such as I-70 and the regional rail transit system, known as FasTracks.

Also, before starting construction of the I-70 project, DEH will work with other agencies to best place air quality monitoring in the Globeville and Elyria Swansea neighborhoods, to measure any potential effects of the construction project. DEH will advocate for mitigation measures, especially for vulnerable individuals near the highway, like those with breathing problems. Special filters added to the ventilation systems of schools have shown to be of benefit in improving indoor air quality by removing outdoor air pollutants, and could be considered here as well.⁹ In addition, DEH and other City agencies are participating in the design process for the I-70 reconstruction project.

Separate from the I-70 construction project, the Colorado Department of Public Health and Environment (CDPHE) will place an additional near-road air quality monitor in north Denver to measure emissions from an interstate highway. This new monitor is a federal requirement, and DEH is working with CDPHE to help make sure the monitor is located appropriately. The monitor may provide additional information relevant to the Globeville and Elyria Swansea neighborhoods. In addition, DEH will pursue funding with our community partners to conduct additional specialized air pollution monitoring in the Globeville and Elyria Swansea neighborhoods. This may also help in the measurement of odor compounds.

In 2014, DEH and Denver Public Health plan to explore whether there are statistically valid relationships between air pollution data and data regarding health conditions, such as asthma that are worsened by air pollution.

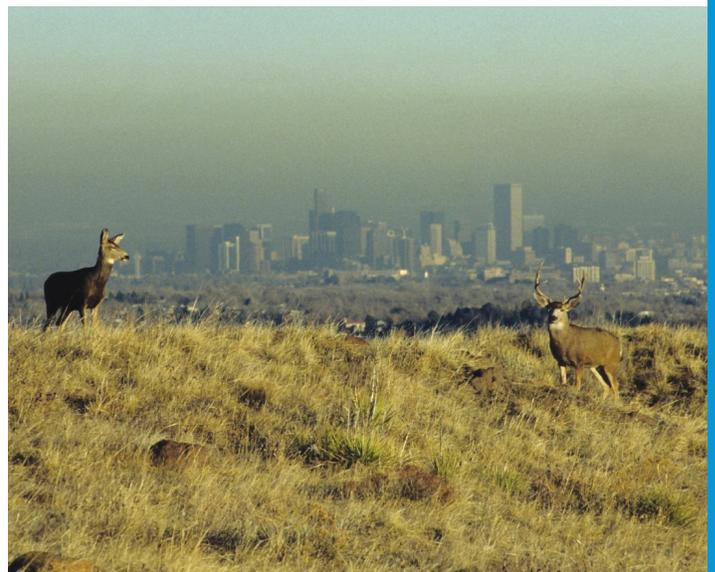
Finally, a potential revision to the health-based national ambient air quality standard (NAAQS) for ozone is likely in the years 2015-16, which might mean additional regional requirements for emissions reductions.¹⁰ Denver will work with CDPHE and the Regional Air Quality Council in all stakeholder processes associated with this and other rulemakings, in an attempt to comply with the new standard.

How Air Quality Affects Health

On average, each person breathes over 3,000 gallons of air per day. When pollutants released from tailpipes and smokestacks get into the air we breathe, it can cause health problems – including asthma, bronchitis, and other respiratory problems. The health and environmental impacts of air pollution are significant, and demonstrate why clean air is one of our most valuable natural resources.

At ground level, ozone is a health hazard for humans, especially the young and elderly. Those who are active and exercising outdoors may experience breathing difficulties and eye irritation when ozone levels are high. Ozone can trigger attacks and symptoms in individuals with pre-existing conditions, like asthma, bronchitis or other respiratory infections.¹¹ In addition, recent studies link nearness to high traffic roads with adverse health effects in children and adults. Much

of the research has focused on associations between exposure to small particulate matter or nitrogen oxides with an increased risk for respiratory effects, like childhood asthma, or cardiovascular effects in adults, such as heart attacks.¹²



Prediction: How the Neighborhood Plans Can Affect Air Quality

The Neighborhood Plans can direct where future industrial businesses are located, to reduce air quality conflicts between residences and businesses. In the past, certain types of businesses (e.g., biofuel plants, fleet operations, auto body shops) were approved by the City to locate in very close proximity to residential neighborhoods. Without a greater buffer distance (or other means to mitigate impacts) between such uses, future conflicts are likely to continue to occur.

Because of where businesses are located and their need for access to transportation, the Neighborhood Plans can identify routes where large trucks may operate in order to minimize air quality impacts on residents.

Additionally, while the I-70 expansion project is not specifically part of the neighborhood plan, its design and construction will have a large impact on the neighborhood. Most immediately, there are concerns for potential additional air pollution during the construction stage.

Finally, in accordance with recent research, locating new schools near emissions sources such as highways or industry will continue to make health conditions like asthma worse among children and youth.¹³

Without a greater buffer (or other means to mitigate impacts) between industrial and residential uses, conflicts affecting the environmental quality of the neighborhoods are likely to continue to occur.

Recommendations to Improve Air Quality

Health Recommendations that Can Be Addressed by the Globeville and Elyria Swansea Neighborhood Plans

1. Minimize negative environmental impacts of industrial uses upon residential neighborhoods through land use designation, buffering, or other means. *(See Section 8, Recommendation 1.A)*
2. Review truck routes in the neighborhoods to improve environmental quality, safety and connectivity. *(See Section 8, Recommendations 11.A)*
3. Increase urban tree canopy with tree planting and green infrastructure to improve environmental quality. *(See Section 8, Recommendation 20.A)*

Health Recommendations that Can Be Addressed by Other Means (by the City, private sector, or nongovernmental organizations):

4. In advance of the I-70 reconstruction project through Globeville and Elyria Swansea: *(See Section 8, Recommendations 1.B)*
 - a. DEH should work with CDOT, CDPHE and Public Works to start defining types of air pollution monitoring that can be done to determine a community baseline.
5. DEH should work with stakeholders to recommend mitigation measures that may be required during the reconstruction of I-70, including upgrading the heating/ventilation/air conditioning (HVAC) system at Swansea Elementary School to improve indoor air quality.
5. The City should explore the feasibility of an environmental review prior to approval of development applications in order to minimize conflicts between industrial and residential uses. *(See Section 8, Recommendation 2.B)*
6. DEH should continue to improve the City's air quality through specific actions can including: *(See Section 8, Recommendation 3.B)*
 - a. DEH should update its community air pollution modeling assessment to a 2011 baseline, and make projections for a future year (such as 2025).
 - b. DEH should work with CDPHE and EPA to establish an additional air quality monitor station in Globeville or Elyria Swansea by 2015, with a goal of quantifying near-highway pollution separately from the I-70 project.

Odors in Globeville and Elyria Swansea Today

Odors can either be pleasant or unpleasant, and an odor that is pleasant to one person can be unpleasant to another. Just because something smells bad does not mean that it is harmful. However, at some point, odors that are objectionable become a nuisance and interfere with quality of life. These are known as **nuisance odors**.¹⁴

Nuisance odors rarely have long-term direct effects on health, but can cause distress for people (depending on the severity, frequency, and duration of the odor). In some cases, if an odor is severe enough, it can be associated with short-term symptoms such as headaches, or irritation of the eyes or throat. These effects usually stop when the exposure goes away. However, long-term exposure to nuisance odors have an indirect effect on health by interfering with quality of life, reducing the desire to be outdoors, and contributing to stress.

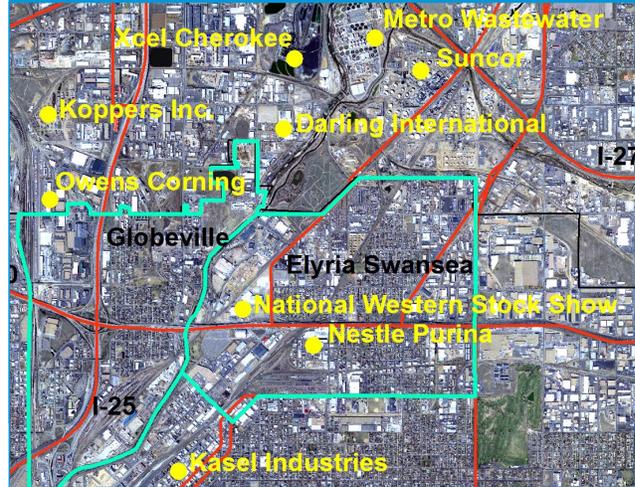
Unlike most other Denver neighborhoods, a majority of the land area in Globeville and Elyria Swansea consists of industrial and commercial businesses, utilities and transportation, including railyards. Over 70% of each neighborhood contains these types of businesses, compared with an average of 35% in Denver overall. The adjacent areas of Commerce City and unincorporated Adams County are heavily industrial as well. A number of local businesses generate odors (*Figure 12*):

- Owens Corning (roofing products manufacturer)
- Koppers Industries (creosote based wood treatment)
- Darling International (animal rendering plant)
- Nestle Purina Pet Care (pet food production)
- Kasel Industries (pet treats)
- National Western Stock Show (livestock)
- Suncor Refinery (oil and gas)
- Metro Wastewater, and
- Xcel Energy Cherokee Generating Station.

Given the concentration of industries surrounding the residential neighborhoods, Globeville and Elyria Swansea residents frequently experience odors and report these odor incidents to the City. Nuisance odors are investigated on a complaint basis and are regulated by City municipal code and state law. For more information on odor investigation and enforcement, see Appendices at www.denvergov.org/behealthydenver.

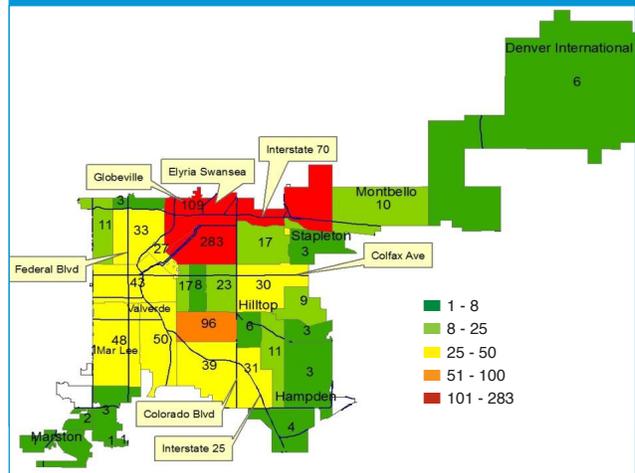
Out of 983 odor complaints in Denver over the last 10 years, over one-third came from the Globeville and Elyria Swansea area (*Figure 13*).

FIGURE 12:
Industrial facilities that can cause odors in and around North Denver



SOURCE: Denver Department of Environmental Health 2014

FIGURE 13:
Odor complaints received in Denver, by zip code, 2004 – 2013



SOURCE: Denver Department of Environmental Health 2014

Odor complaints in Denver tend to happen in the overnight and morning hours, the same time of day that poor air quality is usually recorded. During intense odor episodes caused by stagnant weather conditions in the South Platte River valley, residents describe burning eyes and throats, headaches, skin irritation, and problems sleeping. Many different terms are used by residents to describe the odors.

Of the two hundred households that completed a door-to-door survey in Globeville in 2012, 75% indicated some type of odor had negatively affected their quality of life. Residents described dog food, sewer, animal rendering, vehicle exhaust, and death, as smells present in the neighborhood.¹⁵ Limited air quality sampling was also conducted as part of the project.¹⁶

Recently, the newly legalized marijuana industry in Colorado has resulted in marijuana grow facilities

locating in industrial areas where land or warehouses are available. There are many such areas in Globeville and Elyria Swansea, and they are adjacent to residential neighborhoods. The marijuana grow facilities emit odors when venting their indoor air to the outside. The City has received a number of complaints from residents about odors coming from these facilities.¹⁷ This is an issue that needs further study and consideration, both for health impacts and potential odor mitigation.

How Nuisance Odors Affect Health

Nuisance odors do not necessarily cause long-term health effects, but can cause symptoms such as headaches, nausea, fatigue, runny nose, or irritation of their eyes or throat. Research is ongoing into how much of the reaction is a physical response to the chemical and how much is a result of our perception of the odor.¹⁸

It is known that people react differently to the same odor. People's reactions may vary by the concentration of the odor, how often and for how much time

they're exposed, the type of odor, as well as their own sensitivity. Most health symptoms from odors go away quickly when the exposure stops.¹⁹

Nuisance odors can also have indirect effects on health. They may affect one's quality of life and can reduce the desire to walk, play, or exercise outdoors, or become a source of stress and anxiety. In this manner, they may contribute to long-term adverse health outcomes, whether associated with a direct exposure effect or not.²⁰

Prediction: How the Neighborhood Plans Can Affect Nuisance Odors

Smart land use planning combined with industrial odor control systems will reduce odor impacts.

If industry and business sources of nuisance odors continue to be located near residential areas without any buffer or separation, the nuisance odor issue will likely persist.

The increase in marijuana grow houses in the neighborhoods due to statewide legalization of marijuana has created new odor impacts on residents. The number of grow houses will likely multiply and odors will escalate unless mitigation measures are put in place.

Due to the airborne nature of odors, continued regional cooperation through alliances such as the Northeast Metro Pollution Prevention Alliance (NEMPPA) will be required to reduce odors originating from industries outside of City boundaries.

Some businesses are being proactive in their approach to reduce odors. For example, Nestle Purina Pet Care has implemented a \$1.5 million emissions mitigation plan to reduce odors from the plant's emissions vents. They have installed two plasma ventilation scrubbers and have realized a 90% reduction in odor particulate emissions from those vents. Plasma scrubbers are scheduled to be installed on their remaining emissions vents throughout the next year, with all scrubbers in place by the end of 2015. Purina estimates that the scrubbers will achieve an overall 90% to 95% reduction in odor particulate emissions.

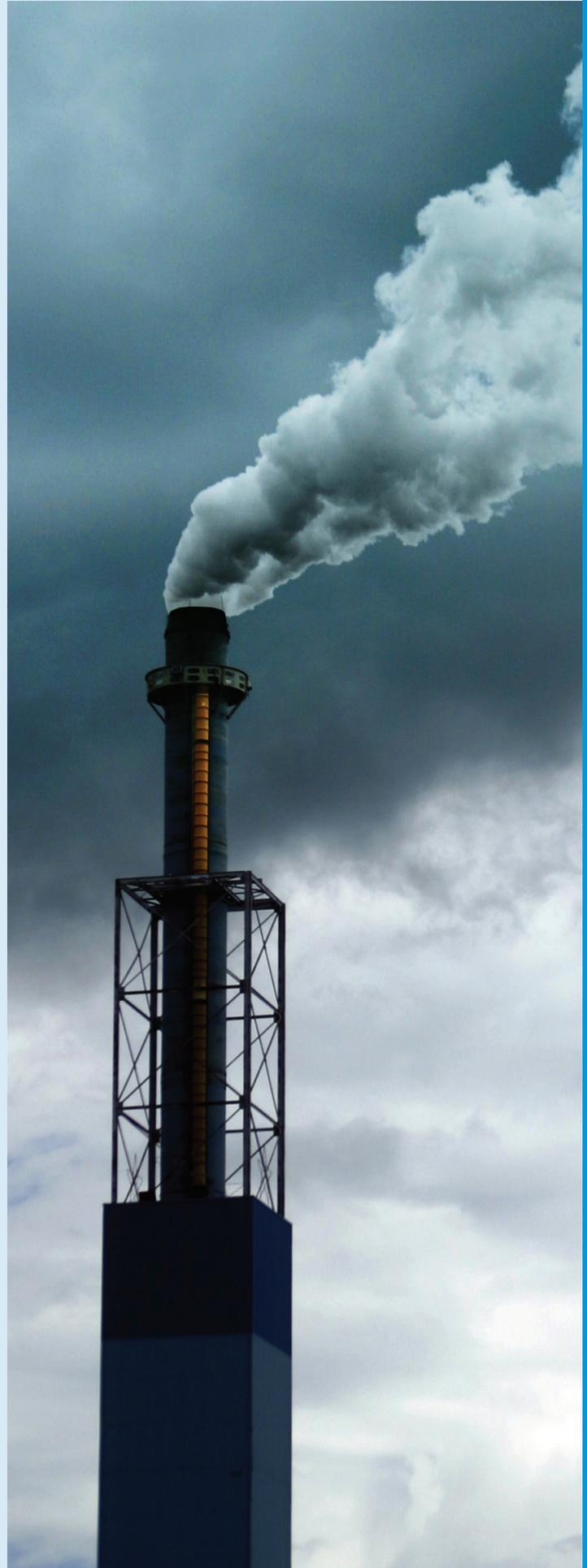
Recommendations to Reduce Nuisance Odors

Health Recommendations To Be Included in the Globeville and Elyria Swansea Neighborhood Plans

1. Minimize negative environmental impacts of industrial uses upon residential neighborhoods through land use designation, buffering, or other means. *(See Section 8, Recommendation 1.A)*
2. Mitigate the odors and emissions from marijuana grow facilities on residential neighborhoods through methods such as land use designation, siting, buffering, or other means. *(See Section 8, Recommendation 8.A)*

Health Recommendations that Can Be Addressed by Other Means (by the City, private sector, or nongovernmental organizations):

3. The City should advocate to state government agencies or research entities for funded research on the potential human health impacts from marijuana grow facilities, as such impacts are unknown. Concerns include emissions to air, odors, mold, and discharges to the water system. *(See Section 8, Recommendation 5.B)*
4. The City should explore the feasibility of an environmental plan review prior to approval of development applications in order to minimize conflicts between industrial and residential uses. *(See Section 8, Recommendation 2.B)*
5. The City should continue to address nuisance odors through specific actions including: *(See Section 8, Recommendation 6.B)*
 - a. DEH should work with City agencies, other government, non-profit, community and industry partners to form a long-term steering committee to implement solutions to reduce odors, potentially including recommendations for local and state policy changes.
 - b. DEH should create and lead a community partnership of interested organizations to pursue funding for research on manufacturing processes that produce odors, and odor monitoring technologies to address nuisance odors in Globeville and Elyria Swansea.
 - c. DEH should continue its work with the Northeast Metro Pollution Prevention Alliance (NEMPPA) to cooperate on potential solutions to odor reduction for industries outside of City boundaries, due to the airborne properties of odors.



Noise in Globeville and Elyria Swansea Today

Noise, or unwanted sound, is detrimental when it harms “individuals or the community in the enjoyment of life, property, and the conduct of business.”²¹

Sound is measured in decibels. Zero (0) decibels is the softest level that a person can hear, whereas normal speaking voices are around 65 decibels. A rock concert can be about 120 decibels. An increase of 10 decibels sounds twice as loud to a healthy human ear (in other words, 60 decibels sounds twice as loud as 50 decibels) The U.S. Environmental Protection Agency (EPA) considers noise exceeding 55 decibels outdoors, and 45 decibels indoors, as an annoyance that can interfere with daily activities such as conversation, working and recreation.²²

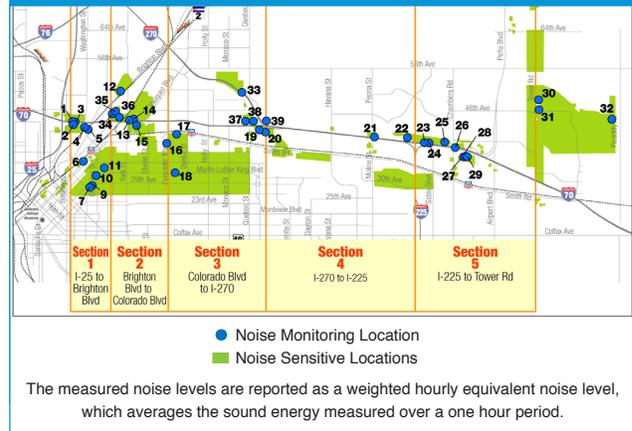
There are several significant sources of noise in Globeville and Elyria Swansea that have been found to exceed acceptable noise thresholds as defined by the EPA:

- Train horns ;
- Train engines ;
- Industrial operations; and
- I-70 located through the southern section of the neighborhoods.

Residents have expressed distress about excessive noise in the neighborhoods for quite some time, and raised those concerns throughout the Neighborhood Planning process.²³ Two recent studies confirm that noise levels in certain areas of Globeville and Elyria Swansea exceed thresholds recommended by the EPA.

A Draft Environmental Impact Statement (DEIS) for the I-70 reconstruction²⁴ found that existing noise levels from traffic in areas near I-70, extending from Brighton Boulevard east to Colorado Boulevard, exceed the 55 decibels noise level that the EPA states can interfere with daily activities (*Figure 14*). These areas include both residential and industrial land uses.

FIGURE 14:
Noise study area for I-70 reconstruction DEIS
(Sections 1 and 2 are located in the Globeville Elyria Swansea neighborhoods.)



SOURCE: I-70 East DEIS, Exhibit 5.12-2

- Noise levels within Section 1 ranged from a low of 62.5 decibels to a high of 68.1 decibels.
- Section 2 included Elyria Swansea and other neighborhoods to the south. Noise levels ranged from a low of 56.5 decibels to a high of 74.6 decibels. As noted earlier, the EPA considers noise exceeding 55 decibels outdoors an annoyance that can interfere with daily activities.

A second study was conducted at the Swansea Recreation Center and Park in 2011²⁵ and found that noise near those specific locations can exceed accepted thresholds. The main sources of noise included:

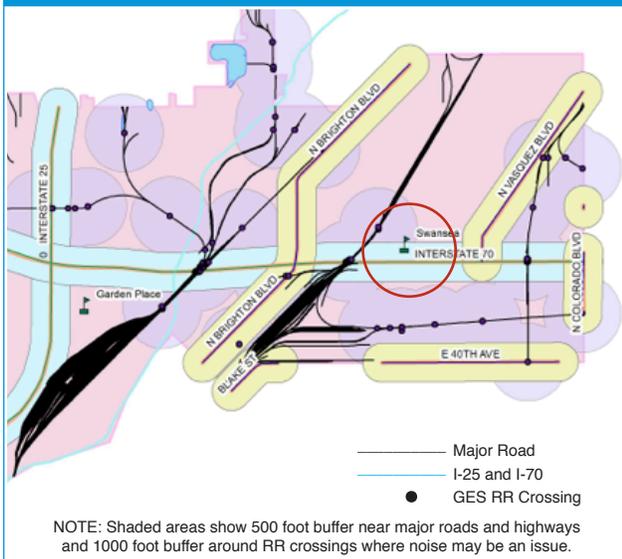
- Train horns – particularly freight trains – when approaching the nearby York St. crossing;
- Train engines and interaction of wheels and the rails;
- Various industrial metal working operations on the west side of the tracks; and
- I-70 located approximately 1,800 feet to the south.

Noise from the train horns was measured as loud as 90 to 100 decibels and likely would be higher closer to the tracks. Trains are required by law to sound their horns when approaching the York Street crossing and other crossings. At the Swansea site, the noise from train engines and wheels was less intense than train horn noise but lasted longer and could be present for many minutes at a time as slow moving trains passed the site.

Noise in Globeville and Elyria Swansea Today continued

The York Street crossing is one of many railroad and road crossings in the Globeville and Elyria Swansea neighborhoods. Figure 15 shows where railroad tracks and streets cross. Average noise levels at the Swansea Recreation Center were approximately 55 decibels and were, in part, the result of industrial activities near the site and traffic noise from I-70 and other roadways.

FIGURE 15:
Areas Affected by Automobile and Train Noise



SOURCE: Denver Department of Environmental Health 2014

Denver ordinances can be used to help control noise from industrial sites; however, the Federal Highway Administration (FHWA) and the Colorado Department

of Transportation (CDOT) are the agencies responsible for regulating noise and roadways.²⁶ The Federal Railroad Administration (FRA) is the agency responsible for regulating train and rail noise.²⁷

In a 1980 publication, the FHWA notes that traffic noise is not usually a serious problem for people who live more than 500 feet from heavily traveled freeways or more than 100 to 200 feet from lightly traveled roads.²⁸ However, Figure 15 shows that there are a number of affected areas in Globeville and Elyria Swansea that are within 500 feet of I-25 and I-70 and 100 feet of other major roadways. Trains start sounding their horns well in advance of railroad crossings, so the areas affected by train noise as shown in Figure 15 are the minimum area impacted.

One of the locations affected by both traffic and train noise is Swansea Elementary School (circled in red in Figure 15). It is well within the 500 foot buffer along I-70. The EPA recommends installing noise controlling features, such as sound walls, for schools located near highways.²⁹ Sound walls along highways and roadways can reduce the volume of traffic noise by up to one-half.³⁰

Another option to address noise from trains is the implementation of a “quiet zone.” A **quiet zone** is a section of a rail line that contains one or more consecutive public crossings at which locomotive horns are not routinely sounded.³¹ In place of the noise from the train horn, alternative safety measures must be put in place to reduce excess risk associated with no use of a horn.

How Noise Affects Health

Excessive noise is a potential health issue in Globeville and Elyria Swansea. Noise can damage health depending on its intensity, duration, type, and source. Long-term exposure to moderate levels of noise can adversely affect sleep, school and work performance, and increase risk of cardiovascular disease. Noise affects sleep both by waking people up and reducing the quality of sleep.

According to the World Health Organization (WHO), an annual average night exposure not exceeding 40 decibels outdoors is recommended for restful sleep.³² Reliable evidence exists showing adverse effects of

chronic noise exposure on children’s ability to learn.³³

To aid student learning and comprehension, it is recommended that school buildings should be designed and built to provide for indoor sound levels of 35 decibels or less.³⁴

Health studies suggest a higher risk of cardiovascular diseases in people chronically exposed to high levels of road or air traffic noise.³⁵ Stress from noise affects biological risk factors such as blood pressure, fats and sugar levels, and blood flow. These changes, due to chronic exposure to noise, increase the risk of high blood pressure, hardening of the arteries and heart attacks.³⁵

Prediction: How the Neighborhood Plans Can Affect Noise

There are several sources of unwanted noise in these neighborhoods, including noise from vehicles, trains and industry that exceeds EPA thresholds. Unwanted noise goes hand in hand with urban landscapes and without controls is likely to increase with growth of local business, transportation corridors and population.

The Metro Denver Economic Development Corporation and the Denver Metro Chamber of Commerce expect job and population growth in the metro Denver region to continue at rates that exceed

Unless active measures are taken, unwanted noise levels in Globeville and Elyria Swansea are likely to stay at existing levels or increase as growth occurs in the neighborhoods and surrounding areas.

national averages.³⁶ Unless active measures are taken, unwanted noise levels in Globeville and Elyria Swansea are likely to stay at existing levels or increase as growth occurs in the neighborhoods and surrounding areas.

Recommendations to Reduce Noise

Health Recommendations To Be Included in the Globeville and Elyria Swansea Neighborhood Plans

1. Sound walls or other noise mitigation measures are recommended along major roadways and highways where sound levels are expected to increase. *(See Section 8, Recommendation 6.A)*
2. Noise in residential areas and at schools near major roadways and highways should be mitigated to no more than 55 decibels, where feasible. *(See Section 8, Recommendation 5.A)*
3. Explore solutions to reduce the noise impacts from trains. These could include “Quiet Zones,” or grade separation of trains from other modes of transportation. One intersection to explore for potential modification includes the train crossing at 47th St. and York St. *(See Section 8, Recommendation 7.A)*

4. Minimize negative environmental impacts of industrial uses upon residential neighborhoods through land use designation, buffering, or other means. *(See Section 8, Recommendation 1.A)*
5. Review truck routes in the neighborhoods to improve environmental quality, safety and connectivity. *(See Section 8, Recommendation 11.A)*

Health Recommendations that Can Be Addressed by Other Means (by the City, private sector, or nongovernmental organizations):

1. The City should work with CDOT to mitigate noise impacts of the I-70 reconstruction during the construction period. *(See Section 8, Recommendation 1A)*



Water Quality in Globeville and Elyria Swansea Today

The South Platte River and Heron Pond are the most significant water features in Globeville and Elyria Swansea and the only ones monitored by the Denver Department of Environmental Health (DEH).

The greatest health concern related to water quality in the outdoor environment is exposure to bacteria while recreating in urban streams and lakes. Water quality in the South Platte River in Globeville and Elyria Swansea tends to be worse than elsewhere in the City, primarily because it is downstream of other pollutant sources in Denver. Water quality in Heron Pond has been affected by runoff from the ASARCO Globe facility in past years. Although there are many opportunities to improve water quality in Heron Pond and in the South Platte River, there are also many challenges.

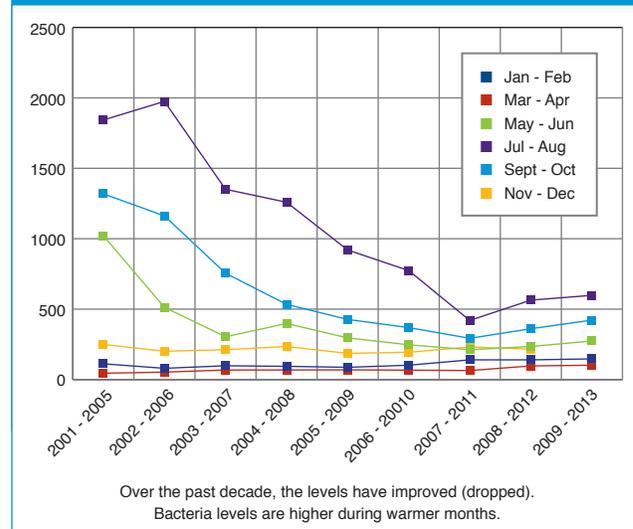
The South Platte River

DEH collects monthly water quality samples from the South Platte River at multiple locations in Denver, including in Globeville and Elyria Swansea. The water quality of the river in these neighborhoods tends to be worse because the area is downstream of Denver's urban core.³⁷ The City's urban downtown area contains large areas of hard surfaces, such as parking lots, roads, and rooftops, that don't allow water to penetrate into the ground. During storms, less water soaks into the ground, and stormwater travels quickly to drainage ditches, streams, lakes, and retention ponds. This runoff can carry oil, chemicals, pesticides, fertilizers, pet waste, debris and sediment from hard surfaces directly into storm sewers, streams, or lakes, without treatment. The cumulative impact of these pollutants becomes greater as the river passes through Denver. Arsenic, a naturally occurring element found in soil and minerals can also be present in the river at higher levels than the state's water quality standards.

As in most urban areas and along most of the South Platte River in Denver, *E. coli* levels are above the state's water quality standards and, as a result, swimming or wading in the river is not recommended. *E. coli* is a bacterium that can make people sick. However, levels of *E. coli* and other pollutants in the river, such as nitrate and phosphorous, have declined steadily over the past decade. Levels of *E. coli* tend to be higher during warmer weather (*Figure 16*).

DEH has undertaken a number of campaigns to educate the public about the importance of avoiding

FIGURE 16:
Changes in mean *E. coli* levels in the South Platte River near 46th Ave.



SOURCE: Denver Department of Environmental Health 2014

contact with the South Platte River when high levels of bacteria are measured, especially during the summer.

Additional outreach to the Globeville and Elyria Swansea neighborhoods may be of benefit in reducing risk of exposure for residents. Also, outreach to businesses about proper disposal of debris and chemicals may help reduce the amount of polluted runoff that enters the river.

Heron Pond Natural Area

Heron Pond Natural Area is a 46-acre designated conservation and restoration area in Globeville managed by Denver Parks and Recreation. It includes a riparian pond and wetlands and is open for public use for walking and jogging, wildlife viewing, photography, and educational activities. Fishing, boating, and swimming (humans or pets) are prohibited in the pond.

Sampling of Heron Pond conducted in 2012 revealed that manganese concentrations were above secondary drinking water standards (non-enforceable standards based on things like taste, odor, or color) and that concentrations of cadmium, iron, and manganese exceeded levels allowed in surface water discharges.³⁸ Cadmium and manganese can be harmful to aquatic life and at high levels (much higher than in Heron Pond), cadmium, iron, and manganese can impact human health, if regularly consumed in drinking water. Heron Pond is closed to aquatic recreational uses and, as a result, health risks to the public are generally minimal.

How Water Quality Affects Health

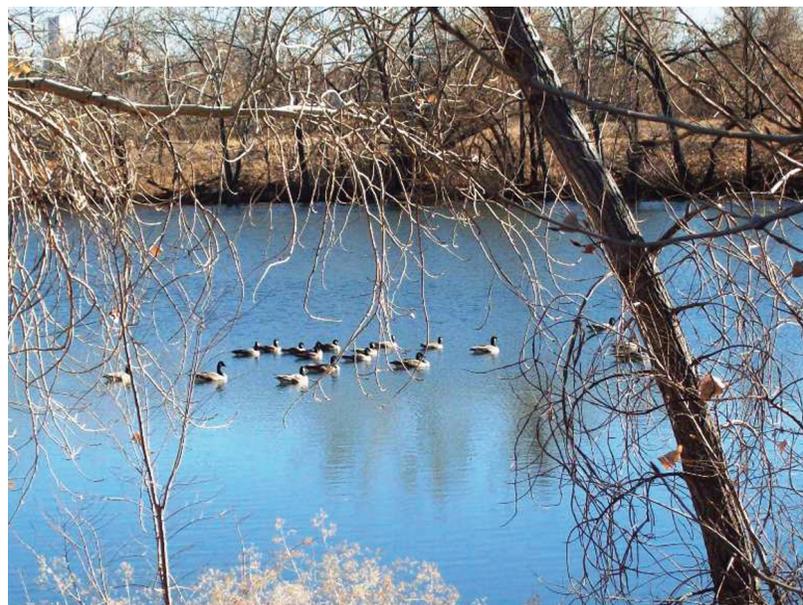
Exposure to pollutants in surface water can occur in two different ways: 1) ingestion, which is drinking the water from a lake or stream or eating fish that have been exposed to pollutants in the water, or; 2) through skin contact with the water. Federal and state water quality standards are intended to protect people from exposure to pollutants, even if they only accidentally ingest a small amount of water during a recreational activity.

In general, concerns about exposure to pollutants in water in the South Platte River due to eating fish or from intentionally drinking the water are relatively minor. While it is possible that people occasionally catch and eat fish from the South Platte, there is not a sustainable population of fish in the river to provide a regular source of food for humans. Likewise, there are not known to be any Denver residences directly obtaining their source of drinking water from the South Platte. The main concern for exposure to pollutants in the South Platte River is through water contact associated with recreational activities. Occasionally, people have been observed wading, swimming, fishing, and boating in the river.

Based on a recreational exposure, the main health concern is people may be exposed to pathogens, that is, microbes that can make you sick. *E. coli* are a common pollutant in urban waterways. Sometimes, especially in the summer, *E. coli* levels in the South Platte exceed the State of Colorado's water quality standard. *E. coli* is an indicator of other types of bacteria, viruses, or parasites, such as *Staphylococcus* (Staph), *Giardia*, or *Cryptosporidium*, that might be present in the water. The most common way to be exposed to pathogens in a stream or lake is by accidentally drinking small amounts of the water. It is also possible to be exposed to pathogens if you enter a stream or lake with open cuts or sores. Symptoms of exposure to *E. coli* or other pathogens can include severe gastrointestinal distress or other types of infection. For example, if you accidentally drank the water you might have tiredness, fever, stomach pain, vomiting, cramps and diarrhea, and if you touched the water and had an open cut you might get a skin infection.³⁹

Prediction: How the Neighborhood Plans Can Impact Water Quality

Development projects including the National Western Center and road improvements including I-70 and arterial streets such as Washington St. and neighborhood streets will all significantly impact water quality in the South Platte River and Heron Pond. Runoff from impervious surfaces such as roads during storm events can carry oil, chemicals, and other pollutants directly into storm sewers, streams, or lakes. Without low impact development techniques such as permeable pavers or bioswales that can treat water coming off of hard surfaces, pollutants will continue to degrade water quality in the South Platte River and Heron Pond.



Water Quality: Challenges and Opportunities

Denver's goal is to have fishable and swimmable waters in all our lakes and streams by 2020. Achieving those goals will be challenging in Globeville and Elyria Swansea for several reasons.

- The area is at the downstream-most limit of the South Platte River in Denver and pollution from upstream sources will need to be addressed before significant improvements in water quality in the Globeville and Elyria Swansea neighborhoods can be realized.
- Heron Pond received runoff from the ASARCO Globe facility for decades and clean up is unlikely. The 1993 Record of Decision for the ASARCO Globe site⁴⁰ includes an estimate for removal of contaminated sediments from Heron Pond of \$8.5 million (adjusted to 2012 dollars by DEH⁴¹). The estimate assumes the waste is disposed of near Heron Pond. Offsite disposal would cost two to three times as much.
- The Globeville and Elyria Swansea neighborhoods are largely built out, and there are only a few existing water quality treatment features in the area. Although there has been discussion of a regional water quality pond at 52nd and Emerson, south of Heron Pond, there is little pressure for other water quality treatment features. Space for installation of water quality treatment features is limited outside of City parks, such as the Platte Farm Open Space.

On a positive note, the City and County of Denver is currently seeking funding to implement some of the recommendations in the River North Master Plan. Once funding is acquired, it may be possible to incorporate features to improve water quality into some of the parks in the Globeville and Elyria Swansea neighborhoods.

Recommendations to Improve Water Quality

Health Recommendations To Be Included in the Globeville and Elyria Swansea Neighborhood Plans

1. Encourage developers to use low impact development and green infrastructure techniques in new development and redevelopment in Globeville and Elyria Swansea to enhance water quality in each basin. *(See Section 8, Recommendation 25.A)*
2. Implement recommendations from the River North Greenway Master Plan to improve water quality. *(See Section 8, Recommendation 26.A)*

Health Recommendations that Can Be Addressed by Other Means (by the City, private sector, or nongovernmental organizations):

3. DEH should partner with other agencies and organizations to improve education and outreach to residents and businesses related to water quality in Globeville and Elyria Swansea. *(See Section 8, Recommendation 7.B)*

Soil Quality in Globeville and Elyria Swansea Today

The Globeville and Elyria Swansea neighborhoods have been the location of a number of industrial activities for more than 125 years, including the site of several historical smelters. Beginning as early as 1870, three smelting plants, the Omaha-Grant, Argo, and Globe operated for varying lengths of time, and refined metals including gold, silver, copper, lead, and zinc. As a result of these activities, the soils in some areas of the neighborhoods required soil remediation (or cleanup). The sections of those cleanup projects that are in residential areas have largely been completed. However, residents continue to express concerns about hazardous materials in the soil, and a distrust of government intentions in the cleanup efforts.

One community member expressed an often-repeated perception:

...“A lot of homes to this day still have contaminated soil because they will not allow EPA to go to their properties because they feel if they signed that consent form they would take away their properties.”⁸

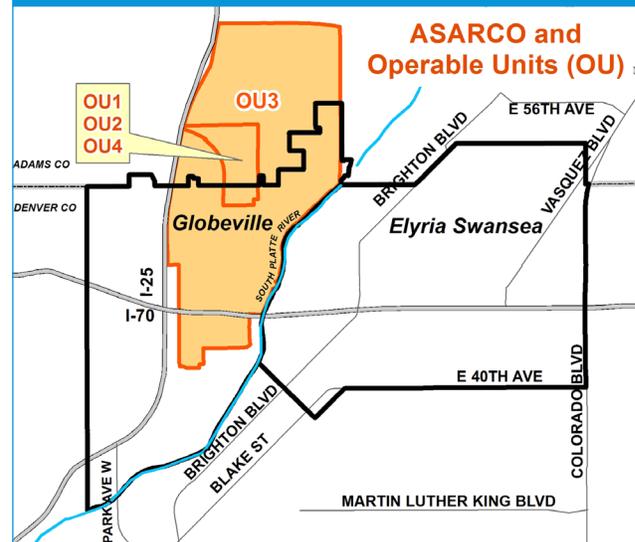
Because of ongoing resident concerns, this Soil Quality section focuses on the two recent environmental cleanups that have occurred in the neighborhoods, namely the Vasquez Boulevard/Interstate-70 Superfund Site (VB/I-70)⁴² and the ASARCO Globe site.⁴³ Both projects are related to historical smelters suspected of contaminating surface soils and, in some cases groundwater and surface water, with metals. The metals of concern for the ASARCO site were arsenic, lead, cadmium, and zinc. While the VB/I-70 site had some properties with elevated levels of arsenic and lead in soil, and cadmium in groundwater near the old Argo smelter site.

ASARCO Globe Site

At the publishing of this report, remediation is ongoing at the site of the former ASARCO Globe smelter as the land is being prepared for redevelopment. Legal controls are in place to prevent future disturbance of the subsurface and to prohibit residential development. Cleanup of soil in the surrounding vicinity was completed a decade ago.

The ASARCO Globe smelter (originally the Holden smelter) operated from 1886 until 2006. Most of the facility site is in Adams County with only the southern portion of the facility in Globeville (within the City of Denver) (Figure 17).

FIGURE 17:
Map of the ASARCO Globe site.
The boundary of the entire cleanup area includes much of the neighborhood of Globeville, as well as extending north into Adams County.



SOURCE: Denver Department of Environmental Health 2014

Soil Quality in Globeville and Elyria Swansea Today continued

In 1983, the state health department sued ASARCO after finding contamination just west of the site nearly a decade earlier. In 1993, CDPHE and ASARCO signed what is known as a Consent Decree that among other activities identified steps for remediation. There were also several civil lawsuits brought against ASARCO that resulted in additional soil cleanup.

CDPHE divided the site into four operable units (OUs), or individual project units:

- OU1 - the Former Neutralization Pond
- OU2 - Groundwater and Surface Soils
- OU3 - Community Soils and Vegetable Gardens
- OU4 - ASARCO Globe Plant site.

Following are descriptions of the history and current status of each operable unit, three of which – OU1, OU2, and OU4 – primarily deal with issues specific to the site of the smelter itself, and one – OU3 – that focuses on the offsite soil contamination in nearby residential and commercial areas.

Facility site (OU1, OU2, and OU4)

Early work at the site of the smelter sought to minimize immediate exposure. Contaminated sediments were excavated and consolidated onsite. Contaminated soils were capped with clean soil to prevent off-site dust emissions. Groundwater was captured and treated before more contaminated groundwater could move off-site. Legal restrictions, called institutional controls, were put into place to limit how the site could be used in the future. Much of this work was completed well before ASARCO filed for bankruptcy in 2005.

In 2010, CDPHE proposed additional work be done at the ASARCO site to complete the earlier work, perform additional soil and groundwater treatment, and provide a site that can be re-used. Buildings were demolished and the site currently is being graded, both to remediate areas of the soil and to provide level ground for future redevelopment. Onsite facility soil that does not meet the cleanup standards for commercial or industrial use are being mixed, chemically stabilized, moved to a designated area within the site, and covered with clean soil. Final development will include areas covered by buildings and pavement, and the institutional controls will remain in place to prevent future disturbance of the subsurface. Residential development is not allowed on the site.

Groundwater is collected and treated to prevent additional new contaminant movement offsite. The cadmium groundwater plume (underground water that

slowly moves through the subsurface) is moving offsite and will continue to fall to safe levels through natural processes. It is expected the plume will meet surface water standards before it encounters the South Platte River, more than one mile away. No nearby residents are drinking the groundwater. As part of the cleanup remedy, CDPHE is monitoring the groundwater status and has the legal responsibility to take action if necessary. The City of Denver monitors the South Platte in several places as well. The closest sampling point is approximately one-half mile downstream from the outfall and does not show elevated cadmium.

Community and Garden Soils (OU3)

The cleanup of community soils (the area surrounding the original site of the ASARCO Globe smelter) began in 1994 and was largely completed by 2002, after all contaminated properties that allowed access for cleanup were provided remediation. The properties were tested, and cleaned if levels of contaminants in soil were above levels determined to be protective of human health. Residents could also choose to have their property cleaned if the soil contained arsenic above the average background (naturally occurring) level for the area. In yards, one foot of soil was removed and replaced with clean soil. In vegetable gardens, 18 inches of soil was removed and replaced. By 2003, approximately 700 residential properties had been remediated in the area near the Globe Plant site. Only a few residents refused access for the cleanup, perhaps less than ten. Similarly, all contaminated schools, parks, and commercial or industrial properties in the area received soil remediation if they allowed access. Again, only a few commercial owners refused access, perhaps less than six. In addition, soil cleanup work was completed at Laradon Hall and Argo Park. The Argo Park project covered several hundred thousand square feet and established a new soccer field on a previously undeveloped portion of the park.



Residential Soils (OU1)

The EPA began cleanup with the residential soils area (OU1) because it most affected people's potential exposure. As of 2014, approximately 98% of the residential properties in the site have been tested and provided cleanup, if needed. Currently, about 100 properties of the more than 4,500 properties within OU1 in the site remain where the owner has not granted EPA access for either testing or cleanup. In those cases, EPA plans to place a notice on the property record to alert future potential property owners and to send an annual letter to these property owners or their renters, so they are aware of the potential contamination. It is likely EPA will determine that these actions complete the cleanup, and will recommend to de-list, or remove, the residential properties (OU1) from the Superfund site designation in their next review cycle, in 2017.

To achieve the successful 98% cleanup rate of all properties in OU1, EPA had taken a series of measures over the years. Starting in 1998 and through 2006, EPA sampled more than 4,300 properties, including neighborhood parks, schools, and a number of alleyways. Property owners were offered a cleanup if the samples showed lead or arsenic above the site cleanup levels. Contaminated soils were removed to a depth of 12 inches, replaced with clean soil, and the yard was re-landscaped. More than 800 properties received a soil cleanup by 2006.

EPA also funded the City to conduct an extensive community outreach program in partnership with CDPHE. The program – known as the VB/I-70 Community Health Program – recruited community members or health promoters (promotoras) to visit residents in their homes, and provide education on the hazards of lead or arsenic exposure. As part of the program, parents could have their children tested for exposure to lead or arsenic and their soil tested by EPA. If a home receiving a soil cleanup also contained lead-based paint, EPA funded a special program to remove or prevent the lead-based paint from contaminating the soil and creating new hazards. The community outreach program ended when most of the site work was complete in 2008.

In 2012 and 2013, EPA again tried to contact property owners and gain access to properties where it previously had been denied, because properties sometimes had new owners. With these efforts, EPA was able to get additional access agreements and perform soil cleanup in the last two years, reaching a cleanup completion rate of 98% of all properties.



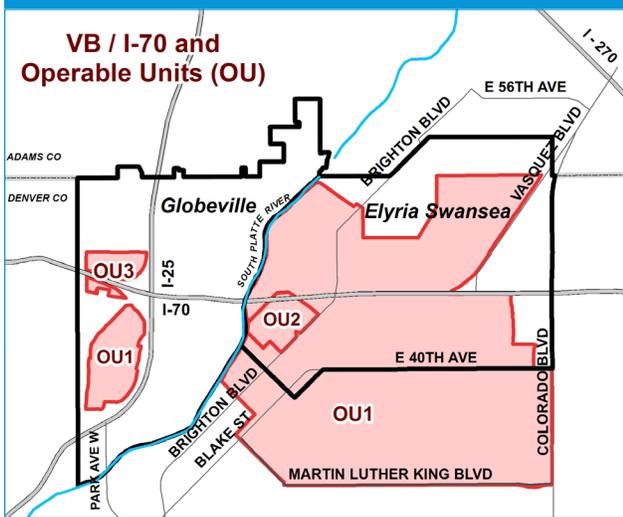
Vasquez Blvd/I-70 site

Because of elevated metals in the soil at the ASARCO site and because there used to be other smelters in the area, the EPA sampled yards in several other nearby neighborhoods. The EPA found elevated levels of arsenic and lead in some residential yards, and listed the area as a Superfund site in 1999. The area was called the Vasquez Boulevard/Interstate-70 Superfund site, and included the neighborhoods of southwest Globeville, Elyria Swansea, Cole, Clayton, and later, part of Curtis Park. The site is approximately 4 square miles in size, and contains more than 4,500 properties with about 17,500 residents (Figure 18).

The VB/I-70 site was separated into three project units, or Operable Units (OUs) to help with clean up:

- OU1 – Residential soils
- OU2 – Omaha-Grant smelter on-facility soils
- OU3 – Argo smelter groundwater

FIGURE 18:
Map of Vasquez Blvd/I-70 Superfund site.
This site is adjacent to the ASARCO site, and includes the neighborhoods of Elyria and Swansea, as well as the southwest portion of Globeville.



SOURCE: Denver Department of Environmental Health 2014

Omaha-Grant Smelter On-Facility Soils (OU2)

OU2 consists of arsenic and lead contaminated soils in a commercial/industrial area located directly on and around the historical Omaha-Grant smelter, in the area now occupied by the Denver Coliseum and nearby businesses. The majority of the affected soils are capped by parking lots, roads and buildings that greatly limit the possibility of human contact. EPA's risk assessment showed risks were limited to workers at the site, if they might regularly be exposed to disturbed soil (USEPA 2009).⁴⁴ Extensive testing has shown the South Platte River is not being affected by the soils. The site is moving through the Superfund process, and a remedy is expected to be chosen in the next year or two.

Argo Smelter Groundwater (OU3)

The historical Argo smelter site is located just west of I-25, in the area of I-70. Like OU2, the smelter was demolished and the area has been redeveloped into industrial and commercial uses. In 2007, EPA determined that the groundwater beneath the site might be contaminated with cadmium from buried wastes. EPA is performing additional testing to determine the extent of the groundwater plume. DEH sampling indicates the contamination has not affected the South Platte River. EPA expects to complete their investigation in 2015, and follow that with a study to identify the best remedy for the site.

How Soil Quality Affects Health

The most common way people are exposed to most metals in soil is through incidental ingestion.⁴⁵ This is when a small amount of dirt or dust is eaten by accident; for example, when a person touches their hands or other objects to their mouth. This is especially important for small children who frequently put their hands or other objects into their mouths, as part of their normal development. Some children also intentionally eat soil, which leads to even greater exposure. Finally, vegetables grown in contaminated garden soil should be thoroughly washed, because this too can be a source of metal exposure.

Other ways of exposure are possible but usually are of less concern for most metals in soil. As part of its risk assessment for the VB/I-70 site, EPA estimated how much exposure could potentially come from breathing dust, if the wind blew contaminated soil into the air. They found it would account for less than one percent of a resident's exposure from incidental soil ingestion.⁴⁶

EPA estimated that mechanical disturbance of soil, such as dust blowing from an uncontrolled construction site, would result in a slightly greater exposure but still only a small fraction of that from incidental ingestion. This means that if ingestion is stopped, the exposure is also mostly stopped.⁴⁷ Therefore, common ways of preventing exposure are to cover the contaminated soil to prevent contact, or to remove the soil. Soil removal was the chosen remedy for residential areas in both Globeville and Elyria Swansea sites.

As discussed, the metals found near the smelter sites include arsenic, cadmium, lead, and zinc. If taken into the body above levels of health concern, several of those metals can potentially cause cancer. Possible non-cancer effects from exposure over long periods of time include damage to the central nervous system, the reproductive system, the kidneys, or the body's blood forming system.⁴⁸

Prediction: How the Neighborhood Plans Can Affect Soil Quality

Future development projects in Globeville and Elyria Swansea could encounter contaminated material when excavating soil. This is true in any historical urban environment, whether near a smelter site or not. Aside from the known sites of buried smelter wastes in the City, potential sources of contamination include gas stations, dry cleaners, fuel storage, or other businesses that used hazardous chemicals.

It is a common business practice for land developers to review available environmental and historical information before beginning a new project. Through this research, known as "due diligence," potential problems are often anticipated and cleanup is incorporated into the project planning.

Recommendations for Soil Quality

Health Recommendations To Be Included in the Globeville and Elyria Swansea Neighborhood Plans

1. The City should continue to be involved in public sector development projects in Globeville and Elyria Swansea, including the I-70 reconstruction and the National Western Center, to help anticipate environmental conditions of concern. (See Section 8, Recommendation 24.A)
3. The City should work with the EPA to continue to take steps to remove the residential portion (Operable Unit 1) of VB/I-70 from the Superfund site (i.e., de-list OU1), as the remedy has been completed. (See Section 8, Recommendation 8.B)
4. The City should work with community partners to provide information to residents about best practices for backyard gardening. (See Section 8, Recommendation 23.A)

Health Recommendations that Can Be Addressed by Other Means (by the City, private sector, or nongovernmental organizations):

2. The City should partner with other agencies and organizations to improve education and outreach to businesses and residents about water and soil quality regulations. (See Section 8, Recommendation 7.B)

References & Endnotes

- 1 Denver Environmental Health (2014). Air Quality Trends through 2012. Environmental Quality Division, Air Quality Program. Accessed at: <http://www.denvergov.org/environmentalhealth/>
- 2 Denver Regional Council of Governments (2010). Regional Traffic Count Program. 24-hour total at I-70 east of I-25: 148,624 vehicles, August 2010 data. Accessed at: <http://gis.drcog.org/trafficcunts/>
- 3 Denver Regional Council of Governments (2010). Regional Traffic Count Program. 24-hour total at I-25 north of 20th St: 252,766 vehicles, September 2010 data. Accessed at: <http://gis.drcog.org/trafficcunts/>
- 4 Zhu, Y, Hinds, WC, Kim, S, Shen, S, and C Sioutas (2002). Study of ultrafine particles near a major highway with heavy-duty diesel traffic. *Atmospheric Environment*, 36: 4323-4335.
Baldauf, R, Thoma, E, Hays, M, Shores, R, Kinsey, J, Gullett, B, Kimbrough, S, Isakov, V, Long, T, Snow, R, Khlystov, A, Weinstein, J, Chen, Fu-Lin, Seila, R, Olson, D, Gilmour, I, Cho, Seung-Hyun, Watkins, N, Rowley, P, and J Bang (2008). Traffic and meteorological impacts on near-road air quality: Summary of methods and trends from the Raleigh near-road study. *Journal of the Air & Waste Management Association*, 58(7): 865-878.
- 5 Colorado Department of Public Health and Environment (2006). Urban Air Toxics Concentrations in Denver, May 2002 through April 2003. Accessed April 16, 2014 at: http://www.colorado.gov/airquality/tech_doc_repository.aspx?action=open&file=DenverAirToxics2002-2003_final.pdf
- 6 Thomas, GW, Williams, SM, Bain, D, and LG Anderson (2008). Community Scale Air Dispersion Modeling in Denver: Airing on the Side of Caution, Denver Environmental Health. U.S. Environmental Protection Agency, Grant No. XA978150-01, 2008.
Colorado Department of Public Health and Environment (2006). Urban Air Toxics Concentrations in Denver, May 2002 through April 2003. Accessed April 16, 2014 at: http://www.colorado.gov/airquality/tech_doc_repository.aspx?action=open&file=DenverAirToxics2002-2003_final.pdf
- 7 McPherson, G, Xiao, Q, Wu, C, Bartens, J, and J Simpson (2013). Urban Forest Assessment for the City of Denver. Accessed at: <http://www.denvergov.org/Portals/747/documents/forestry/Denver.pdf>
- 8 Tenney, M (2014). Stress and the Built Environment: Key Informant Interviews in Globeville and Elyria Swansea. Submitted to Denver Environmental Health. February.
- 9 Ludwig, JF, Vaughn, DL, and PT Roberts (2013). Mitigation of Air Pollutants in Schools in Close Proximity to the MVC, Presentation to the Mountain View Corridor Air Working Group, December 18, 2013, by Environmental Health and Engineering, Inc, and Sonoma Technology, Inc. Accessed at: <http://www.udot.utah.gov/main/uconowner.gf?n=11939615189287621>
- 10 Coomes, J (2014). EPA Draft Policy Document Says Science Justifies Stricter Ozone Air Quality Standard. Bloomberg BNA, from Daily Environment Report, February 4. Accessed at: <http://www.bna.com/epa-draft-policy-n17179881852/>
- 11 US Environmental Protection Agency (2012). Health Effects, Groundlevel Ozone. Office of Air and Radiation, Office of Air Quality Planning and Standards. Accessed at: <http://www.epa.gov/air/ozonepollution/faq.html#health>
- 12 Gauderman, WJ, Vora, H, and R McConnell (2007). Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study. *Lancet*, 369: 571-577.
Kan, H, Heiss, G, Rose, KM, Whitsel, EA, Lurmann, F, and SJ London (2008). Prospective analysis of traffic exposure as a risk factor for incident coronary heart disease: The Atherosclerosis Risk in Communities (ARIC) study. *Environmental Health Perspectives*, 116: 1463-1468.
McConnell, R, Islam, T, Shankardass, K, Jerrett, M, Lurmann, F, Gilliland, F, Gauderman, J, Avol, E, Künzli, N, Yao, L, Peters, J, and K Berhane (2010). Childhood incident asthma and traffic-related air pollution at home and school. *Environmental Health Perspectives*, 118: 1021-1026.
Weinmayr, G, Romeo, E, De Sario, M, Weiland, SK, and F Forastier (2010). Short-term effects of PM10 and NO2 on respiratory health among children with asthma or asthma-like symptoms: A systematic review and meta-analysis. *Environmental Health Perspectives*, 118: 449-457.
- 13 US Environmental Protection Agency (2011). School Siting Guidelines. Office of Children's Health Protection, Washington, D.C., EPA-100-K-11-004. October. Accessed at: <http://www.epa.gov/schools/guidelinstools/siting/>
- 14 MCGinley, MA and CM McGinley (1999). The "gray line" between odor nuisance and health effects. Proceedings of Air and Waste Management Association, 92nd annual meeting and exhibition, St. Louis, MO, 20-24 June 1999.
- 15 Groundwork Denver (2012). Clean Air for Globeville Project. Accessed at: <http://groundworkcolorado.org/projects/clean-air-for-globeville/> In 2011, Groundwork Denver and Globeville Civic Association #1 were awarded grant funds from the Environmental Protection Agency's Environmental Justice program to investigate odors. Anonymous door-to-door surveys were conducted throughout Globeville during 2012. Surveys consisted of twenty-five questions that addressed the type of odors smelled, time of day, suspected sources, and how the odor impacted quality of life. Neighbors were also asked if they experienced health conditions they thought might be related to the odors.
- 16 Morgan, B (2013). Addressing Exposure to Industrial Odors in Globeville, Denver. University of Colorado, CVEN 5939 Practicum Report. April 6. Accessed at: https://mcedc.colorado.edu/sites/default/files/Practicum%20Report_Blayne%20Morgan.pdf

continued

References & Endnotes continued

- ¹⁷ Hughes, T (2014). What's that smell? Legal marijuana growing in Colorado. USA Today, August 11. Accessed at: <http://www.usatoday.com/story/news/nation/2014/08/11/legal-pot-causes-odor-complaints/13896885/>
- ¹⁸ MCGinley, MA and CM McGinley (1999). The "gray line" between odor nuisance and health effects. Proceedings of Air and Waste Management Association, 92nd annual meeting and exhibition, St. Louis, MO, 20-24 June 1999.
- Smeets, MAM (2013). Chemosensory irritation from disagreeable and agreeable odours: subjective versus objective effects. Summary of proposed research. Accessed April 2014 at: <http://www.nwo.nl/en/research-and-results/research-projects/95/1900116695.html>.
- Segala, C, Poizeau, D, and JM Mace (2003). Odors and health: a descriptive epidemiological study around a wastewater treatment plant. [abstract]. *Rev Epidemiol Sante Publique*, 51(2): 201-14. Accessed at: <http://www.ncbi.nlm.nih.gov/pubmed/12876506>
- ¹⁹ New York Department of Health (2014). Odors and Health, revised January 2014. Accessed April 2014 at: <http://www.health.ny.gov/publications/6500/index.htm>
- ²⁰ Ohio Department of Health (2012). Odors and Your Health, revised August 5, 2012. Accessed April 2014 at: <http://www.odh.ohio.gov/-/media/ODH/ASSETS/Files/eh/HAS/odors.ashx>.
- Curren, J (2012). Characterization of Odor Nuisance. Thesis submittal for Doctor of Environmental Science and Engineering, University of California, Los Angeles. Accessed at: <http://www.wcsawma.org/wp-content/uploads/2012/11/JMC-dissertation.pdf>
- Tenney, M (2014). Stress and the Built Environment: Key Informant Interviews in Globeville and Elyria Swansea. Submitted to Denver Environmental Health. February.
- ²¹ Denver Revised Municipal Code (2014). Chapter 36, Noise Control. Accessed at: <https://library.municode.com/>
- ²² US Environmental Protection Agency (2012). Noise Pollution. Office of Air and Radiation. Updated July 2012. Accessed at: <http://www.epa.gov/air/noise.html>
- ²³ Tenney, M (2014). Denver Community Planning and Development [CPD] (2013). Notes from Elyria Swansea Neighborhood Plan public meeting of February 13, 2013, Summary of Feedback, compiled by CPD.
- Groundwork Denver (2013). Elyria Swansea Neighborhood Survey, Summary of 152 survey results. Submitted to Denver Community Planning and Development. Survey conducted October 2013 and March 2014.
- ²⁴ Federal Highway Administration and Colorado Department of Transportation (2008). I-70 East, Draft Environmental Impact Statement, Section 4(f) Evaluation. November. Accessed at: <http://www.i-70east.com/reports.html>
- ²⁵ Hankard Environmental (2011). Results of Noise Analysis for the Proposed Swansea School in Denver, submitted to Denver Environmental Health. December. Survey conducted November 4-14, 2011 at specific sites near Swansea Recreation Center.
- ²⁶ The CDOT noise abatement criteria are provided as an appendix to this report.
- ²⁷ Jurisdiction of Quiet Zones falls under the Federal Railroad Administration (FRA) Locomotive Horn Rule (49 CFR 222). The Electronic Code of Federal Regulations can be accessed at: <http://www.gpo.gov/>
- ²⁸ Federal Highway Administration (1980). Highway Traffic Noise. September. Accessed at: <http://www.nonoise.org/library/highway/traffic/traffic.htm>
- ²⁹ US Environmental Protection Agency (2011). School Siting Guidelines. Office of Children's Health Protection, Washington, D.C., EPA-100-K-11-004. October. Accessed at: <http://www.epa.gov/schools/guidelinestools/siting/>
- ³⁰ Federal Highway Administration (2014). Highway Traffic Noise, Noise Barrier Design. Accessed at: http://www.fhwa.dot.gov/environment/noise/noise_barriers/design_construction/keepdown.cfm
- ³¹ Federal Railroad Administration (2014). The Train Horn Rule and Quiet Zones, Overview. Accessed at: <http://www.fra.dot.gov/Page/P0104>
- Whaley, M (2013). Cities sound off on horns. The Denver Post, December 8. Accessed at: http://www.denverpost.com/news/ci_24678931/train-noise-deafening-residents-economic-development
- ³² World Health Organization (2009). Night Noise Guidelines for Europe. WHO Regional Office for Europe, Copenhagen, Denmark. Accessed at: http://www.euro.who.int/__data/assets/pdf_file/0017/43316/E92845.pdf
- ³³ World Health Organization (2009). World Health Organization (2011). Burden of Disease from Environmental Noise, Quantification of Healthy Life Years Lost in Europe. WHO Regional Office for Europe, Copenhagen, Denmark. Accessed at: http://www.euro.who.int/__data/assets/pdf_file/0008/136466/e94888.pdf
- ³⁴ Acoustical Society of America (2000). Classroom Acoustics: A Resource for Creating Learning Environments with Desirable Listening Conditions. Accessed at: http://acousticalsociety.org/about_acoustics/acoustics_of_classrooms
- ³⁵ World Health Organization (2011). Burden of Disease from Environmental Noise, Quantification of Healthy Life Years Lost in Europe. WHO Regional Office for Europe, Copenhagen, Denmark. Accessed at: http://www.euro.who.int/__data/assets/pdf_file/0008/136466/e94888.pdf
- ³⁶ Metro Denver Economic Development Corporation (2014). Forecast for 2014 Shows Continued Economic Expansion in Metro Denver. Accessed at: <http://www.metrodenver.org/metro-denver-economy/forecasts>
- ³⁷ Denver Environmental Health (2013). Water Quality Update, an Update on Water Quality in Denver's Rivers and Streams in 2012. Environmental Quality Division.
- ³⁸ Denver Environmental Health (2013). Draft Memorandum from L Farrell, Environmental Quality Division, with subject: Phase II Investigation of Heron Pond Water and Sediment, December 2012. January 14.
- ³⁹ K Pond (2005). Water Recreation and Disease, Plausibility of Associated Infections: Acute Effects, Sequelae and Mortality. World Health Organization. Accessed at: http://www.who.int/water_sanitation_health/bathing/recreadis.pdf
- ⁴⁰ Colorado Department of Health (1993). Record of Decision for the ASARCO Globe Plant Site, Denver, Colorado. February 18. Accessed at: <http://www.epa.gov/superfund/sites/rods/fulltext/r1993080003095.pdf>
- ⁴¹ Denver Environmental Health (2013). Follow Up from Today's Planning Meeting for 11/26 52nd & Emerson Public Meeting. Email from D Erickson to J Student and C VanDerLoop. April 10.
- ⁴² US Environmental Protection Agency (2013). Vasquez Boulevard and I-70. Webpage. USEPA, Region 8, Denver, CO. Accessed at: <http://www2.epa.gov/region8/vasquez-boulevard-i-70>
- ⁴³ US Environmental Protection Agency (2010). ASARCO, Inc. (Globe Plant). Webpage. USEPA, Region 8, Denver, CO. Updated July 2010. Accessed at: <http://www2.epa.gov/region8/asarco-inc-globe-plant>
- ⁴⁴ US Environmental Protection Agency (2009). Baseline Human Health Risk Assessment for the Vasquez Boulevard and Interstate 70 Site, Operable Unit 2, Denver, CO. August. Final.
- ⁴⁵ US Environmental Protection Agency Region 8 (2001). Baseline Human Health Risk Assessment Vasquez Boulevard and I-70 Superfund Site, Denver, CO. Denver, CO. August.
- Beck, BD, Rudel, R., Hook, GC, and TS Bowers (1995). Risk Assessment; in Metal Toxicology, eds. Goyer, RA, Klaassen, CD, and MP Waalkes, Academic Press, San Diego, CA.
- Calabreses, EJ, Barnes, R, Stanek, EJ III, Pastides, H, Gilbert, CE, Veneman, P, Wang, XR, Laszity, A, and PT, Kostecki (1989). How much soil do young children ingest: an epidemiologic study. *Regulatory Toxicology and Pharmacology*, 10(2): 123-37.
- Ozkaynak, H, Xue, J, Zartarian, VG, Glen, G, and L Smith (2011). Modeled estimates of soil and dust ingestion rates for children. *Risk Analysis*, 31(4): 592-608.
- ⁴⁶ US Environmental Protection Agency Region 8 (2001). Baseline Human Health Risk Assessment Vasquez Boulevard and I-70 Superfund Site, Denver, CO. August. Appendix B. Screening level evaluation of relative risk for arsenic via inhalation of dust or dermal contact with soil compared to soil ingestion.
- ⁴⁷ This statement is meant to apply to metals in soil. It would not apply if there is an ongoing source of metals being directly emitted into the air, like at an active smelter site.
- ⁴⁸ Agency for Toxic Substances and Disease Registry (2005). Toxicological Profile for Zinc. US Department of Health and Human Services, Public Health Service. Accessed at: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>
- Agency for Toxic Substances and Disease Registry (2007). Toxicological Profile for Arsenic. US Department of Health and Human Services, Public Health Service. Accessed at: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>
- Agency for Toxic Substances and Disease Registry (2007). Toxicological Profile for Lead. US Department of Health and Human Services, Public Health Service. Accessed at: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>
- Agency for Toxic Substances and Disease Registry (2012). Toxicological Profile for Cadmium. US Department of Health and Human Services, Public Health Service. Accessed at: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

Connectivity and Mobility

Summary of Key Findings

Connectivity relates to the number of direct routes between places. Mobility is the ability to move around easily and safely, whether by car, transit, bike or on foot. Connectivity is critical to ensure mobility for all community members. Key findings include:

- Limited connectivity due to multiple railroad tracks, disconnected roads and other physical barriers isolates Globeville and Elyria Swansea residents within their neighborhoods, and from other places. It also limits access to physical activity and recreation opportunities.
- Over half of the public streets in Globeville and Elyria Swansea do not have sidewalks. Those that exist are often broken. There is one separated bike lane in the neighborhoods. Residents also indicate issues with bus schedules and amenities such as benches at bus stops.
- Broken or missing sidewalks, lack of bike lanes, lack of bus amenities, and unsafe intersection crossings all can impact residents' mobility, and will be important to increase access to the transit rail stations currently under construction.
- The opportunity to walk within one's immediate community is a key factor in reducing cardiovascular disease, obesity, and diabetes, which residents in these neighborhoods suffer from at a higher rate than Denver overall.

How the Neighborhood Plans Can Improve Connectivity and Mobility

Better overall connectivity and mobility through improved bicycle, pedestrian, and transit infrastructure could positively impact health in Globeville and Elyria Swansea by increasing physical activity, reducing chronic disease rates and obesity, and increasing the likelihood that residents can access neighborhood destinations safely.



Connectivity and Mobility in Globeville and Elyria Swansea Today

Connectivity relates to the number of direct routes between places. Good connectivity reduces the amount of travel required and often encourages shorter vehicle trips and the use of alternative modes such as biking and walking.¹ **Mobility** is the ability to move around easily and safely, whether by car, transit, bike or on foot. Connectivity is critical to ensure mobility for all community members, regardless of age or physical ability level. This is known as “universal access.”

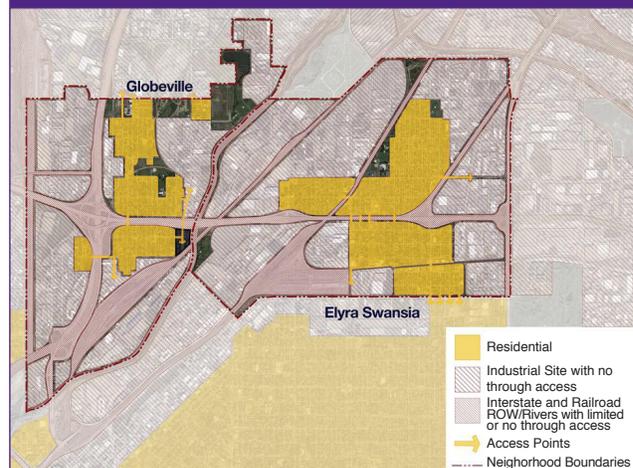
Globeville and Elyria Swansea have been poorly connected to the rest of Denver over the years because of railroad tracks, large industrial sites lacking through streets, dead ends, and the South Platte River. Construction of I-70 and I-25 in the 1950s and 1960s further fragmented these neighborhoods into a series of residential islands.

Connectivity between the neighborhoods is significantly restricted (*Figure 19*). Only two streets provide east-west access between the neighborhoods: 46th Avenue (turns into 47th) and Washington St. (turns into 38th St.). In Globeville, only Lincoln and Washington Streets connect the northern and southern parts of the neighborhood. This impacts daily activities such as children travelling safely to school. Globeville’s neighborhood elementary school, Garden Place Academy, is located south of I-70, while the majority of homes in Globeville are north of I-70. While Globeville and Elyria Swansea are very close to the central business district ((just 20 blocks north of downtown), getting into and out of these neighborhoods on local streets requires circuitous travel routes that add time and distance to trips to work, shopping, schools, and other destinations.

What is universal access?

Universal access is the goal of enabling all citizens to reach every destination served by their public street and pathway system. Universal access is not limited to access by persons using automobiles. Travel by bicycle, walking, or wheelchair to every destination is accommodated in order to achieve transportation equity, maximize independence, and improve community livability. At various stages of life and fortune almost half of the U.S. population does not or cannot own or operate automobiles, or may need wheelchairs to travel as pedestrians. Access to employment, goods and services is essential and must be protected for all persons using public ways.²

FIGURE 19:
Barriers to Connectivity within Globeville and Elyria Swansea



SOURCE: Denver Community Planning and Development 2014



Residents of both Globeville and Elyria Swansea identify a street network characterized by insufficient connectivity as problematic. They express concerns regarding the lack of connections between their neighborhoods and the rest of Denver, and the quality of the transportation environment:⁴ In neighborhood planning meetings, residents have noted:

- The east-west connectivity is poor
- Routes within neighborhoods can be confusing
- 47th St and York Ave is especially unsafe for kids due to RR crossing

- The 45th St. pedestrian bridge is problematic
- Poor connectivity to river
- Need more bike lanes
- Need better access to businesses and schools
- Need safer connections and more sidewalks
- Need infrastructure improvements for all travel modes under the tunnels from Washington St. to 38th and Blake
- Need better bus stop facilities, more stops closer to employers, and good access to new transit rail stations.

Pedestrian and Bicycle Mobility

Sidewalks

Over half of the public streets in Globeville and Elyria Swansea do not have sidewalks, as Figure 20 shows.

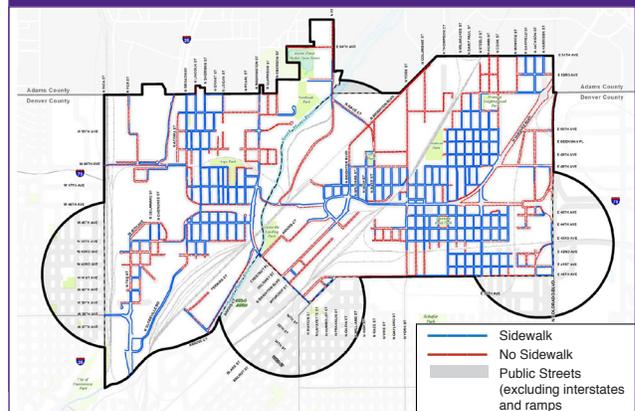
Another way of measuring the pedestrian experience is “walkability,” or the ease and pleasant experience of walking. Walkability depends on several factors including adequate sidewalks, safety (distance from traffic and lighting), living near retail destinations, ambiance and cleanliness, and block length (the distance between intersections). As indicated in Figure 21, Globeville and Elyria Swansea are rated lower for walkability (based on block size) than some other nearby Denver neighborhoods, such as Five Points, Cole and Clayton.

The areas in Globeville and Elyria Swansea that have relatively good walking environments tend to be located in the center of their respective neighborhoods. Areas with poor walkability are located at the edges and boundaries of Globeville and Elyria Swansea, and are not connected to other Denver neighborhoods. Residents have expressed concerns about poor walkability in some areas due to lack of maintenance and unclean conditions, for example in underpasses.

Bicycles

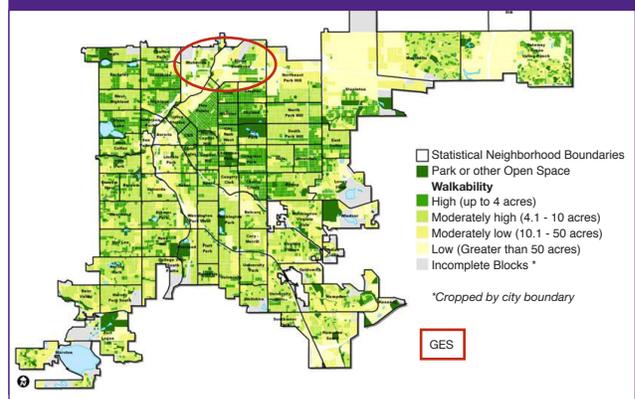
There are four designated bicycle routes through Globeville and Elyria Swansea; however, they all share the travel lane with cars. There is only one separated bike lane, along 45th Avenue in Globeville, connecting to the South Platte River trail. Some residents believe that these bike routes might be insufficient for current

FIGURE 20:
Inventory of Sidewalks in Globeville and Elyria Swansea



SOURCE: Denver Community Planning and Development 2014

FIGURE 21:
Walkability Measure using City Block Size, Denver, 2009



SOURCE: Denver Community Planning and Development 2014

or future needs of the neighborhoods, stating that “the roads are not friendly for cycling and more bike lanes are desired” and the lack of bike lanes “impedes travel within the neighborhoods.”⁴

Pedestrian and Bicycle Mobility continued

Injuries to Bicyclists and Pedestrians

In each neighborhood, there are locations where traffic collisions have resulted in injuries to bicyclists or pedestrians. In particular, 47th St. and Washington in Globeville and 46th St. and Josephine in Elyria Swansea have experienced multiple traffic collisions resulting in injuries and/or death to bicyclists or pedestrians. These incidents discourage people from travelling on bikes or on foot, and necessitate further investigation and solutions that may include additional enforcement, education, or engineering. *(See Community Safety section for more detailed discussion).*

School Zones

There are designated “school zones” around Swansea and Garden Place Elementary schools, but concerns have been raised by residents that the boundaries of the school zones may need adjustment in order to slow vehicle speeds and improve safety for students walking to school.

Trucks

Due to the large number of industrial and commercial businesses in Globeville and Elyria Swansea, freight trucks regularly traverse the neighborhood streets, including the residential areas. Residents have long raised concerns about the dangers posed to pedestrians by the close proximity of trucks. Some businesses have voluntarily re-routed their trucks to nonresidential streets, but there are not specifically designated truck routes due to the numerous industrial businesses located throughout the neighborhood that depend on trucks for deliveries.

Public Transit

Bus Routes and Infrastructure

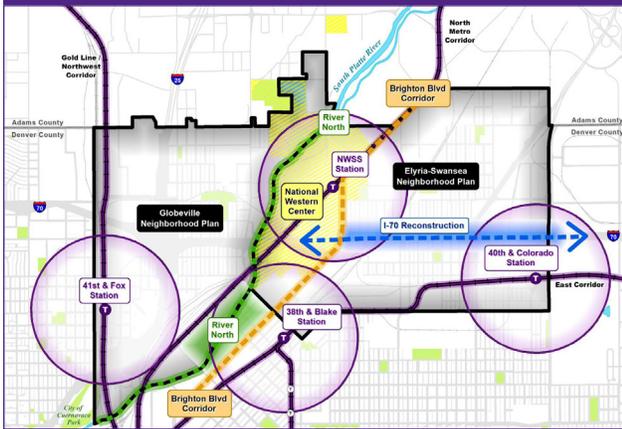
The Regional Transportation District (RTD) operates bus routes along major north/south streets including Lincoln, Washington, York/Josephine, Steele Streets and Colorado Boulevard and east/west along 40th, 47th, 48th, and 52nd Streets. Residents have indicated that these routes may not be serving riders with the most convenient schedules and routes.⁵ Given that residents rely on public transit more frequently than in other Denver neighborhoods, due to lower vehicle ownership, the Neighborhood Plans should recommend that current and future bus routes align with current and future destinations including job centers, schools, and businesses.

Many bus stops in the neighborhoods lack benches. This makes it difficult for riders to use the bus system who need to sit while waiting for a bus. The addition of benches or other amenities such as shelters could enhance the existing bus stop environment and spur additional ridership especially for vulnerable populations. Research shows that providing amenities for barrier-free design encourages bus ridership especially for the disabled, young and elderly.

Rail

Several commuter rail lines are already under construction within and adjacent to Globeville and Elyria Swansea. The community will gain four new transit stations in the next four years as part of the multimillion-dollar infrastructure and redevelopment initiative known as the “North Denver Cornerstone Collaborative.” Globeville will be served by the 41st Avenue and Fox Street station on the Gold Line. The East Rail Line will serve Elyria Swansea with stations at 38th and Blake (on the southern boundary of the neighborhood) and 40th and Colorado, with service east to Denver International Airport. Finally, the North Metro Rail Line will have a station at the National Western Stock Show, a 100-acre complex that is currently undergoing master planning for redevelopment into a year round destination for conventions and tourism, including science, history and agricultural attractions. Additional rail capacity could serve the interior of the neighborhood if the Central Rail Line is linked with the East Rail Line, providing a direct connection between the 38th and Blake station and downtown Denver with no transfers *(Figure 22).*

FIGURE 22:
Planned RTD Rail Lines and Stations within
Globeville and Elyria Swansea



SOURCE: North Denver Cornerstone Collaborative 2014

These new rail lines and stations will provide valuable access to and from downtown Denver, and points north, south, east and west. Station area plans have already been developed for 38th and Blake and 41st and Fox, with transit-oriented development envisioned around the stations.⁶ However, access to the stations from within the neighborhoods will be critical. Perhaps the greatest challenge to pedestrian access is the lack of sidewalks. For example, around the future 38th and Blake station, the majority of streets within a half-mile of the station do not have sidewalks, and a significant portion of those that do have sidewalks that are in poor condition. There are virtually no sidewalks in the River North area within a half-mile of the station.⁷ And the 40th and Colorado station is adjacent to the Market Lead Ditch, an unused below-grade railroad spur between the Elyria Swansea neighborhood and the new station location. These physical barriers will need to be addressed to provide safe, efficient access to the new rail stations.

How Connectivity and Mobility Affect Health

Researchers have identified strong relationships between the way we design and build our communities and our rates of physical activity. Street-scale urban design that supports walking has been found to be effective in increasing levels of physical activity, according to a number of peer-reviewed research studies.⁸ Neighborhoods that contain obstacles such as high traffic volumes and speeds, narrow or missing sidewalks, poor lighting, dangerous intersections, and poor roadway connectivity are likely to discourage walking and bicycling on residential streets.⁹ Conversely, built environments that increase opportunities for active transportation (walking, biking, and use of transit) may decrease the risk of obesity, cardiovascular, and other chronic diseases impacted by physical activity.

Neighborhood elements that are associated with higher rates of physical activity include those sometimes referred to as the “5 Ds”: relatively high residential *density*; *diversity* of land uses (mixed-use development) promoting live-work neighborhoods and neighborhood *destinations* (attractive places to walk or bike to); walkable *distance* to transit; and walkable *design*, which includes well-connected streets, small block sizes, and a high density of intersections.¹¹

The Centers for Disease Control and Prevention asserts that “...integrating health-enhancing choices into transportation policy has the potential to save lives by preventing chronic diseases, reducing and preventing motor-vehicle-related injury and deaths, improving environmental health, while stimulating economic development, and ensuring access for all people.”¹⁰

Prediction: How the Neighborhood Plans Can Affect Connectivity and Mobility

The current conditions in Globeville and Elyria Swansea limit the ability of residents to travel safely and efficiently through their neighborhoods. If disconnected streets and the lack of sidewalks are not remedied, negative health impacts such as pedestrian and bicyclist injuries and low physical activity levels contributing to chronic diseases would be expected to continue. Children and youth in particular suffer the negative health effects of a broken pedestrian system if they cannot safely walk or bike to schools and parks.

Recommendations to Improve Connectivity and Mobility

Health Recommendations that Can Be Addressed by the Globeville and Elyria Swansea Neighborhood Plans

1. Prioritize street infrastructure improvements, including sidewalks, bike lanes, bus stop furnishings, intersection crossings, and connections to transit, to achieve the goals of the 2014 City Council Priorities, *Denver Moves* (2011) and the *Strategic Transportation Plan* (2008). (See Section 8, Recommendation 2.A)
2. Connect streets as prioritized in the Globeville and Elyria Swansea Neighborhood Plans' "Street Grid Connectivity Map." (See Section 8, Recommendation 3.A)
3. Improve connectivity to parks, trails and recreation, especially to the South Platte River parks and trails. (See Section 8, Recommendation 9.A)
4. Improve connectivity and safety in School Zones. Improvements could include analyzing current School Zones and making modifications as necessary. (See Section 8, Recommendation 14.A)
5. Review truck routes in the neighborhoods to improve environmental quality, safety and connectivity. (See Section 8, Recommendation 11.A)
6. Improve access and connectivity to and through residential neighborhoods and the redeveloped National Western Center. (See Section 8, Recommendation 12.A)

References & Endnotes

- ¹ Montana Department of Transportation. Montana Transportation and Land Use: Traffic Analysis Tools- Sketch Planning. Accessed at: <http://www.mdt.mt.gov/research/toolkit/m1/tatools/tlut/cat.shtml>.
- ² Project Universal Access. Universal Access FAQ. Accessed at: <http://www.humantransport.org/universalaccess/page3.html>.
- ³ Notes from Globeville Neighborhood Plan Steering Committee meeting, August 23, 2012, and Elyria Swansea Neighborhood Plan public meeting, Feb 13, 2013
- ⁴ Ibid.
- ⁵ Tenney, M (2014). Stress and the Built Environment: Key Informant Interviews in Globeville and Elyria Swansea. Submitted to Denver Environmental Health February 2014.
- ⁶ Transit-oriented development is attractive, walkable, and sustainable development that allows Denver residents to have fair housing, ample transportation choices and the ability to live convenient, affordable, enjoyable lives. City and County of Denver (2014). "Transit Oriented Development." Accessed at: <http://www.denvergov.org/Default.aspx?alias=www.denvergov.org/tod>.
- ⁷ City and County of Denver Department of Community Planning and Development (2009). 38th and Blake Station Area Plan. Adopted August 10, 2009. Accessed at: http://www.denvergov.org/Portals/193/documents/40th%20and%2040th/38th%20and%20Blake%208_11_09%20for%20web.pdf.
- ⁸ Kahn, LK, Sobush, K, Keener, D, Goodman, K, Lowry, A, Kakietek, J and S Zaro (2009). Recommended community strategies and measurements to prevent obesity in the United States. *Centers for Disease Control and Prevention MMWR*, July 24. 58(RR07): 1-26. Accessed at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5807a1.htm>.
- ⁹ U.S. Federal Highway Authority (2003). A review of pedestrian safety research in the United States and abroad, Final report. Accessed at: <http://www.fhwa.dot.gov/publications/research/safety/pedbike/03042/part3.cfm>
- ¹⁰ McCann, B (2010). Transportation Policy Is Health Policy. Smart Growth America, May 10. Accessed at: <http://www.smartgrowthamerica.org/2010/05/10/transportation-policy-is-health-policy/>.
- ¹¹ Cervero, R (2008). Measuring the effects of land use on travel behavior- D factor adjustments. Accessed at: <http://www.fresnocog.org/files/Blueprint/Agendas/05012008MeetingMaterials/Ds%20in%20Transport%20Planning.pdf>

Access to Goods and Services

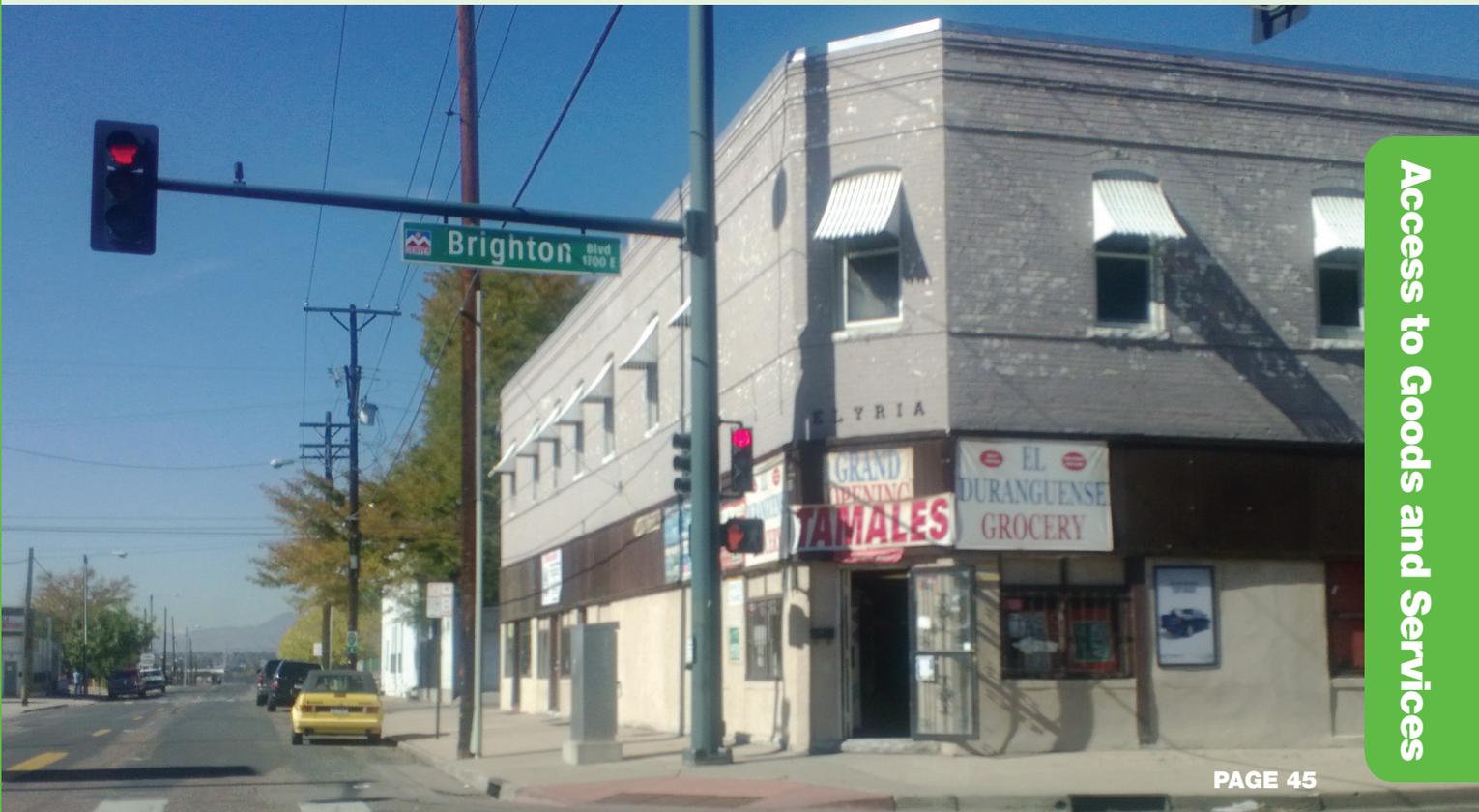
Summary of Key Findings

Local goods and services such as grocery stores, banks, pharmacies, health care, child care, and community centers, churches, schools and parks are important to meet residents' daily needs. Physical barriers in Globeville and Elyria Swansea including railroads, highways and industrial operations pose challenges for getting around. Perhaps due to these barriers, there are few retail stores and businesses. Residents must travel outside of the neighborhood for daily needs, which increases driving, decreases walking, and results in fewer social interactions and “eyes on the street.” Key findings include:

- Globeville and Elyria Swansea residents must travel further – in some cases twice as far as the average Denver resident – to reach a grocery store.
- Over half of respondents in one survey said, “I worry every day about being able to get affordable, healthy food for myself or my family.”
- It takes time and money to leave the neighborhoods in order to access basic daily needs such as shopping, errands, and appointments. Relying on public transit to do so takes even more time and money, resources which are in short supply for many residents.
- While recreation facilities in both neighborhoods exceed the City’s minimum formula of providing 75% of basic amenities, residents report concerns about safety, amenities, and programming that meets their needs, particularly for youth.

How the Neighborhood Plans Can Improve Access to Goods and Services

The Neighborhood Plans can help improve the food environment, without which it is likely that residents of Globeville and Elyria Swansea will continue to experience higher than average rates of poor health. Increasing the number of neighborhood goods and services through mixed-use development and easy access for all with “Complete Streets” will likely increase local trips and promote physical activity in the neighborhood, as well as social interaction and “eyes on the street.” The ability of residents and workers to walk, bike, or use transit to shop, work, recreate and gather as a community can result in improved health.



Access to Goods and Services in Globeville and Elyria Swansea Today

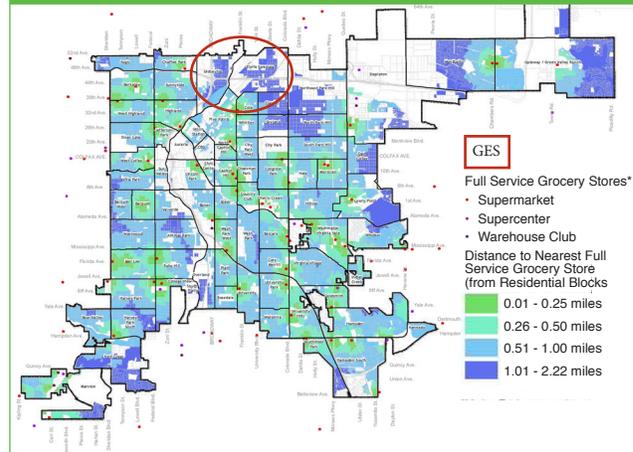
Goods and services such as grocery stores, banks, pharmacies, retail stores, health care and child care are important to meet residents' daily needs. Civic resources such as churches, schools, libraries, and parks and recreation are equally critical. Physical barriers including railroads, highways and large industrial operations have posed challenges for getting around in Globeville and Elyria Swansea for many years. These barriers impact residents' ability to access local stores and businesses by the additional time and distance required to get around easily. Also, perhaps due to these physical barriers, there are a limited number of retail stores and neighborhood service businesses in the community. Residents must travel out of the area to other neighborhoods for their everyday needs, which is time consuming, expensive and even more challenging for those who do not own vehicles and must rely on public transit or carpooling.

Healthy Foods

Residents have consistently identified the lack of a full service grocery store as one of the most critical service gaps in this community of over 10,000 people. In addition, there are 14 convenience or corner stores in this small community, including three 7-Elevens. Corner stores rarely offer fresh produce, whole grains, or staples, but offer an abundance of processed foods high in sugar, salt and fat.

The average distance that residents in the City of Denver travel to reach the closest full service grocery store is just under one mile. Elyria Swansea and Globeville residents must travel farther – in some cases twice as far as the average Denver resident – to reach a grocery store (*Figure 23*).¹

FIGURE 23:
Distance to Nearest Full Service Grocery Store map (miles)



*Note: Data current as of August 2012, with selected stores updated as of January 2014. Some stores may have opened or closed since original data was collected in August 2012.

SOURCE: Denver Office of Economic Development 2014

To get to a grocery store residents without a personal vehicle may need to rely on public transportation, which can be infrequent, may not stop close to the store, and fares can be expensive if family members want to travel together to shop. Globeville and Elyria Swansea residents have lower average incomes than Denver residents overall, and lower vehicle ownership, factors that increase the barriers to obtaining healthy food.

In addition to the lack of grocery stores and transportation hurdles, **food insecurity**² – or limited access to food due to lack of money – is more prevalent in these neighborhoods than other parts of the state. In one survey, 34% of residents reported that they “sometimes or always could not afford to eat a balanced meal,”³ compared with about 16% of residents statewide (and nationwide) who faced financial challenges to put food on the table in 2012.⁴ A high number of residents are eligible for Supplemental Nutrition Assistance Program (SNAP)⁵ benefits, but are not enrolled for reasons that may include concern about legal resident status. This further limits residents’ access to healthy and nutritious foods.

In addition to full-service grocery stores, other sources of healthy food can include farmers’ markets, community gardens, and community supported agriculture (CSA), a co-op model. However, these are seasonal and do not provide a year-round source of nutritious, affordable food. The GrowHaus, a



nonprofit greenhouse located in Elyria Swansea, has a small retail market and sells CSA boxes. Residents note that this is a much appreciated amenity in the neighborhood, and an important part of a healthy food system, but a local grocery store would offer full time access to a complete range of nutritious, affordable foods.

The GrowHaus is a non-profit indoor farm, marketplace and educational center located in Elyria Swansea. It serves as a hub for urban agriculture, education, and job training. The GrowHaus sells a limited amount of produce to the public through retail sales (priced on a sliding scale) and weekly produce boxes.



In recent surveys by local community organizations, residents described the challenges posed by the lack of a grocery store in the neighborhood and their desire for healthy food options:⁶

- More than three-quarters said there are not stores close to the neighborhood that sell fruits and vegetables.
- More than two out of every five respondents said it is challenging to get fruits and vegetables; for example, “The corner stores do not have a lot of fresh fruits, and the prices are higher. They have a lot of expired foods.”⁷
- Over half of respondents agreed with the statement “I worry EVERY DAY about being able to get affordable, healthy food for myself or my family.”

In addition, representatives of community health organizations in the neighborhood discussed how lack of healthy food impacts residents:⁸

- Citing the public health issues associated with not having access to a grocery store, one respondent noted, “Lack of access to grocery stores is a concern that causes stress for residents. Many use public transportation and the stores are too far away by bus...and they still have all their stuff to carry.”
- Another respondent noted that healthy food isn’t even available for health promotion activities, saying “When we are having a class and trying to get healthy snacks for a class, there is no real place to go...”
- And, “There are more marijuana stores than grocery stores... .”

Neighborhood Services

Residents in Globeville and Elyria Swansea also desire other neighborhood stores and services such as pharmacies, shops, banks, markets, health care facilities, and a neighborhood destination such as a Main Street.⁹ They note that it takes more time and expense to reach shops and services outside their neighborhood, and they often have to accept poor quality substitutes or go without. Residents comment that one of the best aspects of the neighborhood is its convenient, central location; close to downtown and with lots of transportation options. However, more retail shops and services, including “mom and pop stores” would allow residents to stay in their community to shop. This could help to strengthen the local economy, create jobs, support social cohesion, improve safety with more “eyes on the street,” and provide a host of other benefits.

The lack of a full range of goods and services in the neighborhood, combined with connectivity problems with roads, sidewalks and transit, can contribute to health conditions like obesity and cardiovascular disease. It takes time and money to leave Globeville and Elyria Swansea for necessary daily needs, which prevents residents from doing other things that could promote better health, like recreation and physical activity. The constant challenge to access healthy food, medicine, and other basic needs may also lead to chronic stress (*see Mental Wellbeing section*).

“There are more marijuana stores than grocery stores....”

Access to Goods and Services in Globeville and Elyria Swansea Today

continued

Parks and Recreation

There are 97 acres of parkland within 8 parks in Globeville and Elyria Swansea, serving about 10,000 residents. There are four recreation centers within the neighborhoods, and an additional one on the border with the Cole neighborhood to the south. (Figure 24)

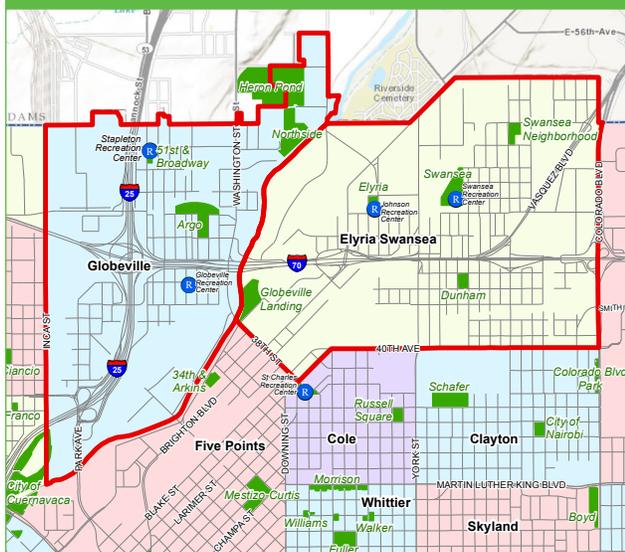
Globeville's central park is Argo Park, which has an outdoor pool and is in the northeast quadrant of the neighborhood where the largest portion of Globeville's residents live. Other Globeville parks include the twin facilities of Northside Park and Heron Pond/Heller Open Space in the far northeast of the neighborhood. The city-run Stapleton Recreation Center is at 51st Street and Broadway, while the Globeville Recreation Center that is privately run, is in the southeast quadrant close to Garden Place School. Neither recreation center has an indoor pool; locals wish that Stapleton had an indoor pool to complement the outdoor pool at Argo Park.¹⁰

Elyria Swansea is home to four parks including Elyria, Swansea, Swansea Neighborhood, Dunham Lee and Globeville Landing parks. The Johnson Recreation Center at 48th and Race is housed in the Colorado Miners Community Center, and the Swansea Recreation Center has typical indoor exercise and recreation facilities along with an outdoor pool.



Overall, the facilities at Globeville's and Elyria Swansea's park and recreation centers were on par with many others in Denver, according to *The Game Plan*, Denver's Parks Master Plan. When compared to national benchmarks, the neighborhoods have enough softball and baseball fields, they could use more soccer and multi-use fields, and their recreation centers exceed the City's 75% standard for basic amenities.¹¹

FIGURE 24:
Parks in Globeville and Elyria Swansea

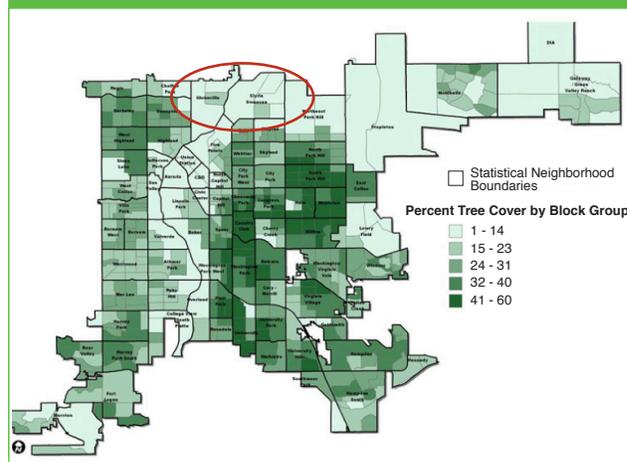


SOURCE: Denver Parks and Recreation 2014

Despite this status, residents in Globeville and Elyria Swansea report mixed opinions about recreation facilities. In Globeville, people like the playgrounds and picnicking in the parks, as well as Argo Park and its pool. But Northside Park is underutilized, partially due to connectivity issues. The park “is hard to get to, hard to find, and is accessed through the adjacent National Guard facility.”¹² Proximity to the South Platte River Greenway doesn't seem to encourage access by local residents either. Residents want improvements to the local parks and recreational facilities, including restrooms and better maintenance of existing parks. In addition, there are concerns about safety in the parks, especially at night due to maintenance problems, inadequate lighting, and improper use by outsiders.¹³ Residents pointed out the need for recreation centers and other service providers to work together to offer “motivating” programs for kids for physical activity and to act as gathering places for neighbors.

Finally, the scarcity of trees in Globeville and Elyria Swansea might also reduce use of parks and outdoor recreation by local residents and thus lead to lower rates of physical activity. A recent inventory of Denver’s tree cover, or “tree canopy,” shows that the two neighborhoods are among those with the lowest amount of tree cover in Denver (*Figure 25*). This lack of adequate tree cover causes higher local temperatures, or “urban heat islands,” and poorer air quality, two environmental conditions that may cause residents to skip exercising outside on a hot day. The City of Denver’s master plan for parks, *The Game Plan*, recommends vastly increasing the city’s tree canopy from the current 6 percent citywide to 10 percent in commercial areas and 18 percent in residential neighborhoods.¹⁴ According to this goal, Globeville and Elyria Swansea should be among the first neighborhoods in Denver to receive additional tree planting to meet the City’s minimum tree canopy goal in residential areas.

FIGURE 25:
Percent of Tree Cover in Denver Neighborhoods



SOURCE: Denver Parks and Recreation 2014

According to this goal, Globeville and Elyria Swansea should be among the first neighborhoods in Denver to receive additional tree planting to meet the City’s minimum tree canopy goal in residential areas.

How Access to Goods and Services Affects Health

Neighborhoods offering a range of goods and services – including healthy food and a wide range of parks and recreational opportunities – are considered good for health. The more destinations there are nearby, the more likely that people will be able to shop, run errands, and recreate with safety and ease; socialize with neighbors; support their communities and be supported in return. But residents in Globeville and Elyria Swansea do not have easy access to a wide array of goods and services and their health may suffer as a result.

How Access to Healthy Food Affects Health

Food access is having sufficient resources, both economic and physical, to obtain appropriate foods for a nutritious diet.¹⁵ Improving access to healthy food has been recognized by national agencies and associations including the Centers for Disease Control and Prevention (CDC), the Institute of Medicine (IOM), and the American Heart Association (AHA) as a necessary strategy to reduce obesity and improve the public’s health. While not the sole solution to the complexities of the obesity epidemic, access to nutritious and affordable food is an important factor enabling community residents to make easy, healthy choices about their diets.¹⁶

Healthy eating is associated with lower risk for Type 2 diabetes, high blood pressure, heart disease, certain cancers, and obesity.¹⁷ More than 75 studies in the past three years have examined the direct health impacts of access to healthy food on diet and on the risk of obesity or overweight, as measured by fruit and vegetable consumption or body mass index (BMI) respectively. Key studies include:

- One study of 70,000 adolescents indicated that greater availability of supermarkets was associated with lower adolescent BMI scores. It also found that a higher number of convenience stores was related to higher BMI among students.
- A 2011 study by Washington State University found lower rates of diabetes, obesity and mortality were associated with more per capita grocery stores.
- A nationally representative sample of low-income households found that easy access to supermarket shopping was associated with increased household use of fruits.¹⁸

How Access to Goods and Services Affects Health

continued

Inequalities in Access to Healthy Food

Many studies have documented how low-income communities and communities of color have less access to healthy food than higher-income and less diverse communities. Not only is finding healthy food challenging, but research has shown that these communities are often surrounded by abundant sources of unhealthy food, such as convenience stores, liquor stores,¹⁹ and – in Colorado now – marijuana dispensaries selling “edibles.” Together, the barriers inhibiting access to fresh foods and the plethora of inexpensive convenience foods can make it more difficult for people living in these communities to eat a healthy diet. The constant challenge to finding healthy food can lead to chronic stress (see *Mental Wellbeing* section).

How Access to Goods and Services Affects Health

To be healthy, neighborhoods need more than just healthy food. Residents need access to a wide range of goods and services in order to meet their daily needs efficiently and cost effectively, without excessive travel outside of the neighborhood.

Mixed-use development – locating a combination of residential, office, commercial, cultural or institutional uses together – allows residents to live, work, play, learn and shop within close proximity. Mixed-use development creates “walkable” neighborhoods and makes people much more likely to walk or use transit to run errands, go shopping, or go to lunch than does spread-out, automobile-oriented single-use development. Destinations located within ¼ to ½ mile of each other are most likely to promote walking. Researchers have found that even a base minimum of physical activity can help combat obesity.²⁰ Studies show that:

- 43% of people with safe places to walk within 10 minutes of home met recommended physical activity levels; among those without safe places to walk just 27% met the recommendation.
- Residents are 65% more likely to walk in a neighborhood with sidewalks.

- People in walkable neighborhoods did about 35–45 more minutes of moderate intensity physical activity per week and were substantially less likely to be overweight or obese than similar people living in low-walkable neighborhoods.²¹

Residents are 65% more likely to walk in a neighborhood with sidewalks

One way to improve physical access is by building complete streets. A **complete street** is intentionally designed to enable bicyclists, motorists, trucks, public transportation vehicles and riders, and pedestrians of all ages and abilities to safely move along and across a street. Complete streets include sidewalks and destinations to walk to, such as shops, businesses, and neighborhood goods and services. Complete streets make it easy to cross the street, walk to shops, and bicycle to work (Figure 26).

FIGURE 26:
A “Complete Street”



© Queen’s Printer for Ontario, image source: Ontario Growth Secretariat, Ministry of Infrastructure

Complete streets in Globeville and Elyria Swansea could enable more physical activity and reduce the associated health conditions of obesity, overweight, cardiovascular disease and diabetes.

How Access to Parks and Recreation Affects Health

The overall health benefits of access to and use of parks and recreation for physical activity are well known in research literature. Physical activity reduces obesity, diabetes, and cardiovascular disease. Physical activity in a park or recreation facility also builds social cohesion, allows for the enjoyment of a natural landscape, and can benefit mental health as well.²²

As mentioned previously, an adequate tree canopy in parks and recreation areas can provide shade and cooler local temperatures, creating a more inviting climate for prolonged physical activity.

Prediction: How the Neighborhood Plans Can Improve Access to Goods and Services

It is likely that residents of Globeville and Elyria Swansea will continue to experience higher than average rates of poor health in the current food environment. Even if other factors improve (such as increased education about cooking and eating healthy foods), the availability of healthy food is a necessary element to improve health. Lack of access to healthy food also results in chronic stress and worry of figuring out how to get to a grocery store in another community. These mental health impacts would not be expected to improve until healthy, affordable foods are available in the neighborhood.

Development of a wider array of retail shops and services within the neighborhood could also positively impact residents' health by promoting more walking, decreasing automobile use, and creating a vibrant pedestrian environment with more "eyes on the street."

Better maintenance, improved safety and more programming and classes in parks and recreation centers could increase recreational usage within Globeville and Elyria Swansea, particularly by children. This in turn could increase residents' physical activity levels and contribute to reductions in obesity, cardiovascular disease, and stress.



Recommendations to Improve Access to Goods and Services

Health Recommendations that Can Be Addressed by the Globeville and Elyria Swansea Neighborhood Plans

1. Promote mixed use development to support a variety of commercial and retail businesses and services throughout the community and around new rail stations. (See Section 8, Recommendation 18.A)
2. Connect streets as prioritized in the Globeville and Elyria Swansea Neighborhood Plans' "Street Grid Connectivity Map." (See Section 8, Recommendation 3.A)
3. Implement "Complete Streets" including sidewalks for all new and redesigned streets, to provide safe and convenient access for all users. (See Section 8, Recommendation 13.A)
4. Increase the urban tree canopy to create an inviting environment for outdoor physical activity. (See Section 8, Recommendation 20.A)
5. Incentivize development of retail goods and services, including a grocery store. (See Section 8, Recommendation 10.A)
6. Promote new sources of healthy foods within the redeveloped National Western Center, such as grocery stores, farmers markets, and community gardens. (See Section 8, Recommendation 16.A)
7. Implement a "healthy corner store retail program," similar to the in Philadelphia model, to add healthy foods to the existing convenience and corner stores. (See Section 8, Recommendation 17.A)
8. Develop a flexible market space that can support a variety of neighborhood goods and services and culturally relevant activities. (See Section 8, Recommendation 19.A)
9. Improve connectivity to parks, trails and recreation, especially to the South Platte River trails and parks. (See Section 8, Recommendation 9.A)

References & Endnotes

- ¹ Social Compact (March 2011). City of Denver Grocery Gap, p. 11. Accessed at: <http://www.socialcompact.org>.
- ² Coleman-Jensen, A, Nord, M and A Singh (2013). Household Food Security in the United States in 2012. Economic Research Report No. ERR-155. September. Accessed at: <http://ers.usda.gov/publications/err-economic-research-report/err155.aspx>
- ³ LiveWell GES (2013). Globeville and Elyria Swansea Food Assessment, November.
- ⁴ Hunger Free Colorado estimate based on Food Research and Action Center, Food Hardship in America 2012, February 2013, and U.S. Census Bureau, American Community Survey 2012, September 2013.
- ⁵ Denver Human Services. 2011 CBMS SNAP caseload data and 2011 American Community Survey 5-year estimates.
- ⁶ LiveWell GES (2013). Globeville and Elyria Swansea Food Assessment, November.
- ⁷ Tenney, M (2014). Stress and the Built Environment Key Informant Interviews in Globeville and Elyria Swansea, February.
- ⁸ Ibid.
- ⁹ Elyria Swansea neighborhood planning meeting summary, January 9, 2013, and Globeville neighborhood planning meeting summary, August 28, 2012.
- ¹⁰ Denver Park Map, http://www.denvergov.org/Portals/747/documents/parks/DenverParkMap_and_Guide.pdf
- ¹¹ The Game Plan, <http://www.denvergov.org/parksandrecreation/DenverParksandRecreation/Planning/MasterPlans/tabid/443687/Default.aspx>.
- ¹² City and County of Denver Department of Community Planning and Development., 2013. Globeville and Elyria Swansea neighborhood planning meeting notes.
- ¹³ Ibid.
- ¹⁴ The Game Plan, <http://www.denvergov.org/parksandrecreation/DenverParksandRecreation/Planning/MasterPlans/tabid/443687/Default.aspx>.
- ¹⁵ World Health Organization. Food Security. Accessed at: <http://www.who.int/trade/glossary/story028/en/>
- ¹⁶ Bell, J, Mora, G, Hagan, E, Rubin, V, and A Karpyn (2013). Access to Healthy Food and Why It Matters: A Review of the Research. PolicyLink, p. 12. Accessed at: http://www.policylink.org/atf/cf/%7B97c6d565-bb43-406d-a6d5-eca3bbf35af0%7D/GROCERYGAP_FINAL_NOV2013.PDF
- ¹⁷ U.S. Centers for Disease Control and Prevention. Accessed at: <http://www.cdc.gov/nutrition/professionals/index.html>
- ¹⁸ Bell et al. (2013).
- ¹⁹ Ibid., p. 9.
- ²⁰ Eitler, TW, ET McMahon, and TC Theorig (2013). Ten Principles for Building Healthy Places. Washington, D.C.: Urban Land Institute, p. 22.
- ²¹ Smart Growth America (2014). Accessed at: <http://www.smartgrowthamerica.org>
- ²² Centers for Disease Control and Prevention. Accessed at: <http://www.cdc.gov/physicalactivity/everyone/health/index.html>

Community Safety

Summary of Key Findings

Community safety includes traffic, pedestrian and cyclist safety; crime and fear of crime; and personal safety. Elements that impact community safety include street and pedestrian conditions, lighting, graffiti, and tolerance of illegal activities. Key findings include:

- Injuries and deaths of pedestrians and cyclists in recent years raise significant concern and promote the feeling of an unsafe physical environment in Globeville and Elyria Swansea.
- There is a mismatch between reported crime rates and resident perceptions of criminal activity. Property crime is down significantly in both neighborhoods, yet fear of crime remains high.
- Street lighting is inadequate and is accentuated by lack of porch light use by many residents.
- The presence of graffiti, darkness, illicit activities and stray animals leads to a fear of crime.

How the Neighborhood Plans Can Improve Community Safety

Improvements in the physical environment such as street safety and lighting, as well as increased crime reporting and enforcement, can improve community safety. Mitigation measures to prevent crashes can likely reduce crashes that lead to injuries and deaths, and more street lights in the neighborhoods will likely reduce crime and perceptions of crime.

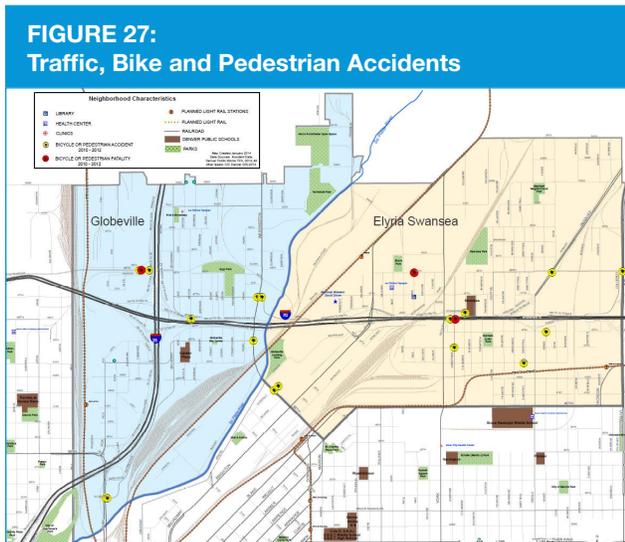


Community Safety in Globeville and Elyria Swansea Today

Traffic, Bike and Pedestrian Safety

From 2010-2012 there were 21 accidents in the community involving injuries or fatalities to cyclists or pedestrians. Areas of high concern, with multiple injury accidents include 46th and Josephine in Elyria Swansea, where there was one fatality; 47th and Washington in Globeville; and 48th and Bannock (frontage road just west of I-25) in Globeville, also with a fatality (Figure 27).

These pedestrian- car and bicycle-car crashes need to be thoroughly reviewed to understand the nature of the crashes. Specific attributes can be studied to understand these crashes and to develop mitigation measures, including: crash circumstance (time of day, weather); crash type, built environment contributing factors (such as lighting or blind spots), and pre-crash behavior of the road users.

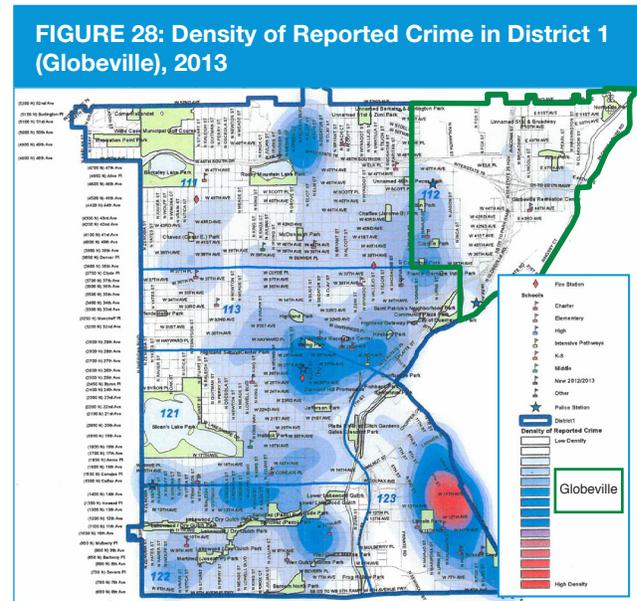


SOURCE: Denver Public Works/Denver Police Department 2014

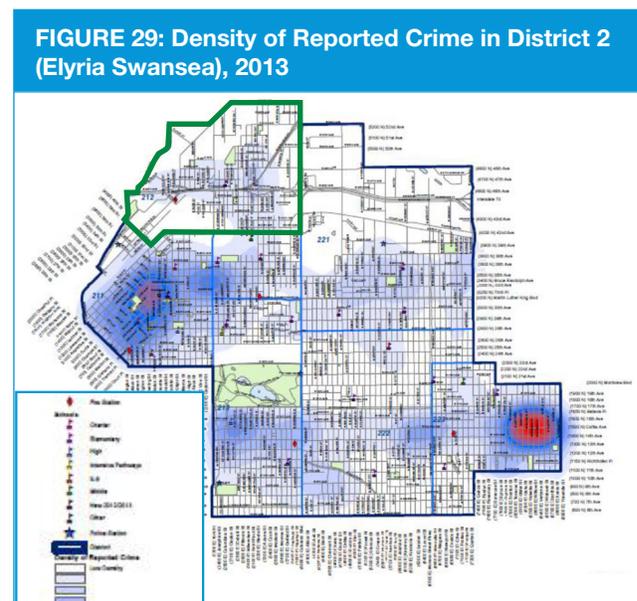
Additionally, the multiple at-grade railroad track crossings in the neighborhoods create the potential for pedestrians to cross paths with trains, and at least one recent incident resulted in a tragic outcome. The time that the trains take for switching activities can block the roads for over 30 minutes at a time, and pedestrians are tempted to jump between train cars just to get where they need to go.

Crime Incidence and Crime Reporting

There are several different ways to assess crime. One is the number of calls that the police receive in each neighborhood per year. In Figures 28 and 29 below, the lightest colors show the least amount of crime reported, and the darker blue and red colors show the most crime reported. By this measure, in 2013, both Globeville and Elyria Swansea had some of the lowest amounts of reported crime compared to other neighborhoods within their police district.



SOURCE: Denver Police Department 2014



SOURCE: Denver Police Department 2014

Another measure of crime is to compare the number of reported offenses from one period to the next. In the first quarter of 2014, crime in Elyria Swansea was down 17% compared with the first quarter of 2013. Property crime in particular decreased by 35%. In Globeville, property crime was down by 11% over the same period.¹

The Police Department uses the “3-E” approach to crime prevention: *education, enforcement, and engineering*. This approach has been effective in both Globeville and Elyria Swansea to reduce crime and improve safety.

In Globeville, the Police Department met with the neighborhood organization in summer 2013 after it was newly redistricted into District 1. Residents’ number one complaint was loud car stereos (“boomers”) around Argo Park and 45th, and 47th and Washington. District 1 began with education outreach: they placed electronic signboards on the roads for two weeks saying “Loud stereos will be cited in two weeks.” Then, after two weeks, officers started issuing citations for loud stereos. After that combination of efforts, the use of loud stereos was greatly reduced in the neighborhood.

Engineering can also come into play. To reduce speeding near Garden Place Academy, District 1 put speed trailers out to clock speeds, then increased officer presence and started writing tickets. Finally, they requested that the Public Works Department paint contrasting stripes on the crosswalk to improve safety.

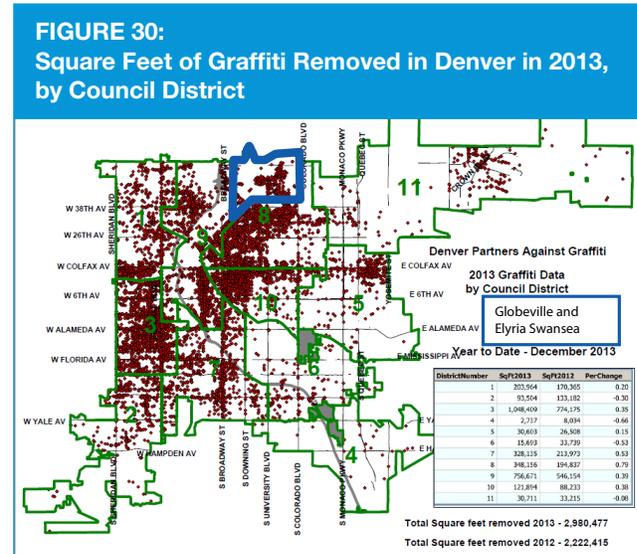
In Elyria Swansea, District 2 officers cite increased reporting as one of the factors in lowering crime in recent months. District 2 also uses social media to connect with citizens, and has reached out to taxi drivers for additional “eyes on the street” during daytime hours. Spanish speaking officers help to ‘break the walls down’ with monolingual residents and build trust. Also, District 2 offers free consultations with local businesses and residents for Crime Prevention Through Environmental Design (CPTED) tailored to their location. The District completes about five to eight CPTEDs per month.

Both Districts have a Citizens Advisory Group (CAG) and meet monthly to share information and hear residents’ concerns.

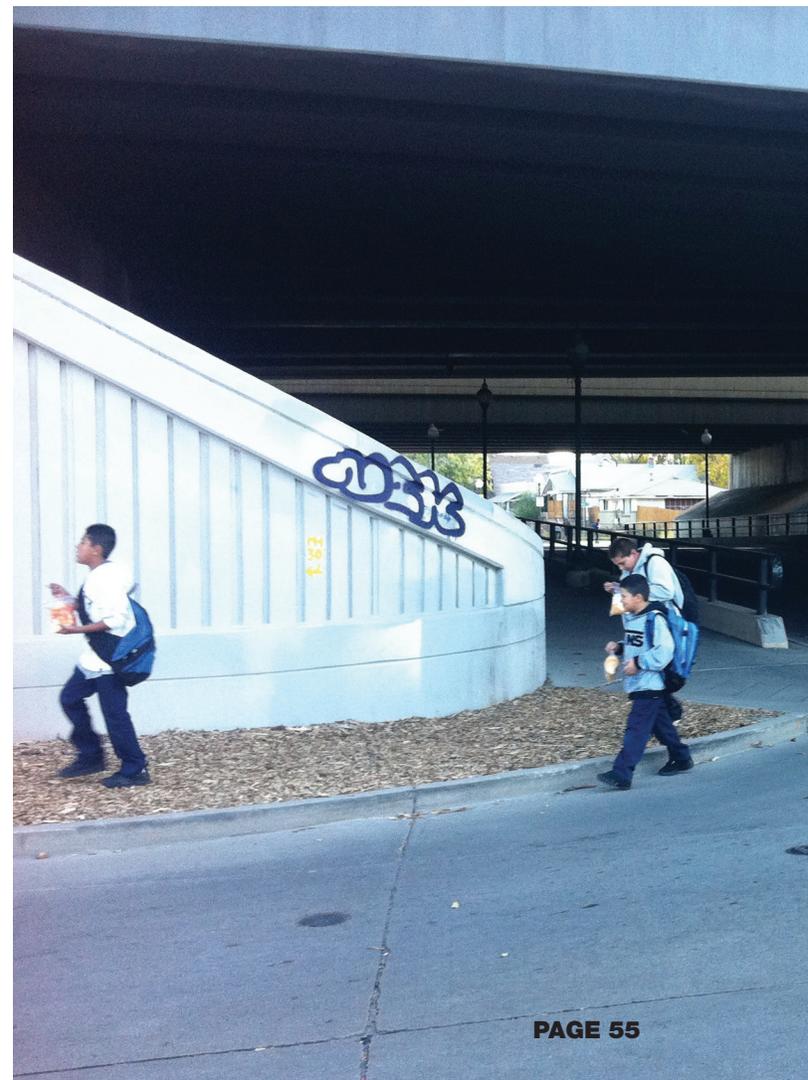
Graffiti

The Denver Police Department tracks reporting and removal of graffiti throughout the City (Figure 30). From 2012 to 2013, there was a 38% increase in the square footage of graffiti tags removed in all of Council District 9 (which includes Globeville and Elyria Swansea). The City cleans graffiti in response to citizen

reports to 3-1-1, or City staff (Police and Public Works) identifying graffiti tags for removal. The increase in the amount of graffiti removed could indicate increased reporting of graffiti by residents. When graffiti is reported and removed quickly, “taggers” learn that the community will not tolerate graffiti, and they tend to move elsewhere.



SOURCE: Denver Police Department 2014



Community Safety in Globeville and Elyria Swansea Today continued

Perception of Crime

In contrast to these efforts, though, Globeville and Elyria Swansea residents are concerned about crime in their neighborhoods. Through the neighborhood planning process, interviews and surveys, residents state that they are concerned about graffiti, gangs and drug use. In addition, residents cite meth houses and homes where marijuana is grown indoors, often with children present, as factors that create fear in the neighborhood. Also, the recently legalized marijuana industry in Colorado has produced a large demand for warehouse space for indoor marijuana “grow operations.” Globeville in particular has many warehouses that contain marijuana grow operations. While the use is legal by zoning, grow facilities are targets of burglary and robbery due to the value of the marijuana seeds, plants, and buds.²

One reason for the gap between actual crime rates and fear of crime may be that neighborhood conditions cause residents to feel unsafe. Another reason may be that residents under-report crime. One community member said that the thinking may be that this environment is normal:

“...what are the police going to do? ... If I've heard shots fired (numerous) times this week already, why would I call on this one?”³

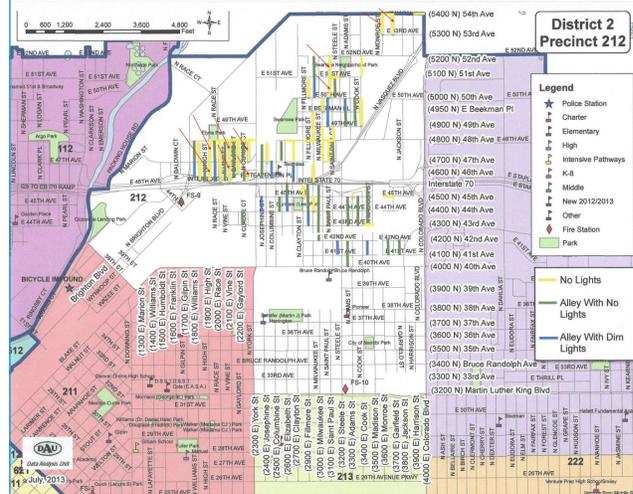
The paradox is that if crime is not reported, the police cannot respond and provide more resources to combat criminal activity (i.e., more frequent patrols, etc). This sets up a repetitive cycle for crime – and the perception of crime – to continue.

Lighting

A recent survey by the Denver Police Department found areas in each neighborhood with inadequate street lighting (indicated in yellow in Figure 31). In Elyria Swansea, many of the streets north of 46th Ave do not have street lights, and some alleys have no lights or are dimly lit.⁴

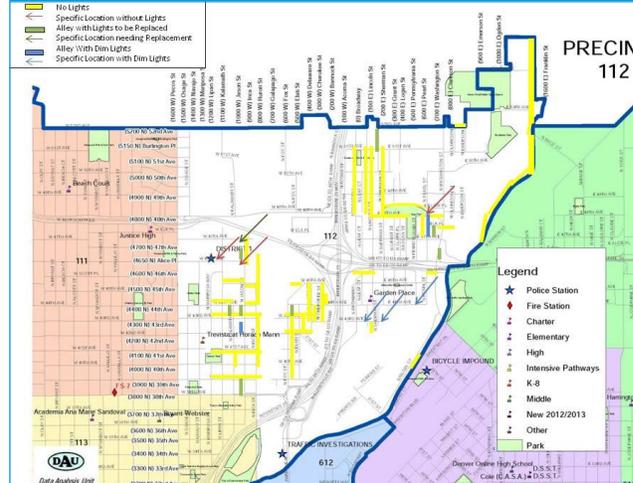
Similarly, the Globeville lighting survey revealed several streets and locations that also need new light poles or bulbs (indicated in yellow in Figure 32). In addition, approximately 90% of residences in Globeville did not have porch lights on at night. This contributes to a general feeling that the neighborhood is dark.⁵

FIGURE 31:
Lighting Survey of Elyria Swansea Neighborhood, 2014



SOURCE: Denver Police Department 2014

FIGURE 32:
Lighting Survey of Globeville Neighborhood, 2014



SOURCE: Denver Police Department 2014

Perception of Safe and Unsafe Places

Residents in Globeville and Elyria Swansea say that certain places in the neighborhood feel safer than others. In a public meeting in January 2014, community members identified areas where they feel safe or unsafe due to traffic accidents or crime. The “safest” places included Garden Place and Swansea Elementary schools, and Argo Park. A sample of children at both elementary schools were surveyed in 2013 about feeling safe; about 50% of children reported “always” feeling safe when they are outdoors in their neighborhoods.⁶

Reasons that residents feel unsafe include accidents, crime or personal safety, stray dogs in the neighborhood, or poor lighting, which was a repeated concern particularly in the parks (Argo, Swansea, Northside) and in industrial areas.⁷

At the neighborhood planning meeting in January 2014, residents indicated on a map those places where they feel most unsafe (*Figure 33*):

FIGURE 33:
Places Where Residents Feel Unsafe Due to Accidents or Crime, 2014

	Due to accidents	Due to crime / personal safety
Globeville	45th and Washington	East of Broadway from 47th to 49th
	51st and Washington	Along Platte River trail
Elyria Swansea	47th and Brighton Blvd	Between 47th and 48th, Williams and High
	47th and York (RR tracks)	

SOURCE: Denver Department of Environmental Health 2014

How Community Safety Affects Health

Traffic, pedestrian and bicycle safety and real and perceived crime in a community all contribute to a sense of community safety. In addition to pedestrians and cyclists being injured in accidents, other factors that can contribute to fears of an unsafe environment include physical signs of disorder such as abandoned buildings, graffiti, litter, and loitering. Several studies have found that the amount of physical disorder in a neighborhood is linked to fear of crime.⁸ Physical neighborhood design that encourages interaction and a sense of community has been shown not only to reduce crime, but also to create a sense of community safety and security.⁹

Slower vehicle speeds result in fewer pedestrian injuries. With vehicle speeds below 20 miles per hour (mph) the probability of serious or fatal injury is less than 20% of the probability of injuries at higher speeds; with speeds above 35 mph, most injuries are fatal or incapacitating.¹¹

Bike lanes keep bicyclists safer. One study found the risk of injuries to cyclists was lowest on roads with on-road bike routes, on-road marked bike lanes, and off-road bike paths, compared to roads without any of these. Street lighting and paved surfaces also improve cyclist safety.¹²

Traffic Crashes and Injuries

There has been a lot of research conducted on the relationship between traffic crashes and injuries to passengers, cyclists and pedestrians. Traffic speed, traffic volume and road design are key factors that affect how many injuries there are in an accident and how severe they may be.

One review of 16 research studies found 11% fewer road traffic injuries in areas designed to reduce traffic speeds with features such as narrow travel lanes, medians, sidewalks and street trees.¹⁰



How Community Safety Affects Health continued

Crime and Perception of Safety

Actual crime activity in a community and fear of crime can both affect health. Victims of crime can experience direct health impacts including physical injuries or psychological trauma. Area-wide violent crime is associated with a range of health issues, such as more heart disease and less physical activity.¹³

A study of more than 10,000 people in England found that fear of crime was associated with poorer mental health, reduced physical functioning, and lower quality of life. Participants exercised less, saw friends less often, and participated in fewer social activities, and reported greater fear, more likelihood of depression and worse mental health than less fearful participants.¹⁴

Research suggests that people do not all experience fear of crime equally. One study found that fear of crime affects certain sub-groups in particular, such as low-income mothers, and resulted in less social activity and less health-promoting community involvement.¹⁵

Fear of crime often stems from the condition of the physical environment in a community. Broken sidewalks, poor lighting, graffiti, and boarded up buildings can signal a sense of social disorder,¹⁶ as well as fewer “eyes on the street,” resulting in increased fears for personal safety. What is known as the “Broken Windows” theory suggests that a neighborhood’s physical condition sends out messages about the kinds

of behavior that are permitted. The author explains, “If a broken window is unrepaired, all the windows will soon be broken. Broken windows are a signal that no one cares.”¹⁷

How people perceive their environment influences their decision to walk in the neighborhood, thereby impacting their level of physical activity. Feeling safe, seeing an appealing aesthetic environment, and having a connected street layout with close destinations are all necessary to increase walking.¹⁸

Lighting and CPTED

Street lighting has an important role in crime prevention. Improved street lighting is thought to affect crime in two ways: by increasing surveillance, thus deterring potential offenders, and by signifying community investment and pride in an area.¹⁹ In 13 different studies of street lighting in communities in the United Kingdom and United States, there was a 21% drop in crime in places that improved street lighting compared to similar areas that did not improve lighting.²⁰

Another practice is Crime Prevention Through Environmental Design, or CPTED. This uses specific design practices such as improving visibility to increase surveillance and limiting points of entry in public areas to control access. CPTED has shown some promising results in reducing crime but the research is still limited.²¹

Prediction: How the Neighborhood Plans Can Affect Community Safety

Vehicle crashes leading to injuries and death can likely be reduced through analysis of crash circumstances and implementation of mitigation measures such as design and engineering, education, and/or enforcement programs for intersections where multiple accidents now occur.

Increases in number of street lights in the neighborhoods will likely lead to reduced crime and perceptions of crime, and increased feelings of community safety.

Prompt reporting and removal of graffiti will likely discourage “taggers” from repeatedly targeting the community, and likely lead to increased perceptions of community safety.

Recommendations to Improve Community Safety

Health Recommendations that Can Be Addressed by the Globeville and Elyria Swansea Neighborhood Plans

1. Explore measures to reduce the incidence of pedestrian and bicycle injury crashes at locations where multiple crashes have occurred. (See Section 8, Recommendation 4.A)
2. Install new and/or upgraded street lighting per the recommendations of the Denver Police Department lighting survey. (See Section 8, Recommendation 15.A)
3. Prioritize street infrastructure improvements, including sidewalks, bike lanes, bus stop furnishings, and intersection crossings. (See Section 8, Recommendation 2.A)
4. Review truck routes in the neighborhoods to improve environmental quality, safety and connectivity. (See Section 8, Recommendation 11.A)
5. Explore solutions to reduce the negative health impacts from trains. These could include “Quiet Zones,” or grade separation of trains from other modes of transportation. (See Section 8, Recommendation 7.A)

6. Enforce regulations regarding graffiti, vandalism, public drug use, stray animals and property maintenance to increase safety. (See Section 8, Recommendation 21.A)
7. Increase education and outreach to citizens about pedestrian safety, in anticipation of increased pedestrian activity with the upcoming redevelopment projects. (See Section 8, Recommendation 22.A)

Health Recommendations that Can Be Addressed by Other Means by the City, private sector, or nongovernmental organizations

8. The City and private developers should work together to encourage crime prevention through use of environmental design principles in new development and redevelopment projects. (See Section 8, Recommendation 9.B)



References & Endnotes

¹ In May 2013 the Denver Police Department implemented the Unified Summons and Complaint (US&C) process. This process unifies multiple types of paper citations, excluding traffic tickets, into an electronic process. That information is transmitted to the Denver Sheriff, County Court, City Attorney and District Attorney through a data exchange platform as needed. As a result of this process a reported offense is generated which was previously not captured in National Incident Based Reporting System (NIBRS). It is difficult to compare current US&C data to data collected prior to May 2013 under the old system.

² Denver Police Department District 1, interviews, January 2014.

³ Tenney, M (2014). “Stress and the Built Environment” Key Informant Interviews in Globeville and Elyria Swansea, February.

⁴ The Denver Police Department recently conducted lighting surveys in both Globeville and Elyria Swansea as part of a citywide survey effort. Streets and alleys with no lights or dim lights were identified. The Police Department works with Denver Public Works and Xcel Energy to replace street light bulbs that are burnt out, and install new light poles where more light is needed.

⁵ The Police Department is reaching out to residents through flyers and community meetings to encourage them to turn their porch lights on at night. Police District 1 also convenes a monthly Citizens Advisory Group to share updates on crime and safety and ask citizens for their input on the need for additional patrolling in areas of concern. This partnership enables citizens to share in crime prevention and proactive measures to increase safety in the community.

⁶ Group Health Research Institute and University of California Berkeley (2013). Healthy Eating Active Living, Youth Food and Physical Activity Survey: Baseline results for Garden Place Academy (Denver County). Center for Community Health and Evaluation, and Atkins Center for Weight and Health. May.

Group Health Research Institute and University of California Berkeley (2013). Healthy Eating Active Living, Youth Food and Physical Activity Survey: Baseline results for Swansea Elementary (GES County). Center for Community Health and Evaluation, and Atkins Center for Weight and Health. June.

⁷ Tenney, M. (2014).

⁸ Latkin, CA and AD Curry (2003). Stressful neighborhoods and depression: A prospective study of the impact of neighborhood disorder. *Journal of Health and Social Behavior*, 44(1): pp. 34-44. Accessed at: <http://www.jstor.org/stable/1519814>

⁹ Calhoun, J (2002). National Crime Prevention Council. New Partners for Smart Growth: Building Safe, Healthy, and Livable Communities. 2nd Annual Conference flyer.

¹⁰ Bunn, F, Collier, T, Frost, C, Ker, K, Roberts, I and R Wentz (2003). Traffic calming for the prevention of road traffic injuries: systematic review and meta-analysis. *Injury Prevention*, 9: 200–204.

¹¹ Leaf, WA, and DF Preusser (1999). Literature Review on Vehicle Travel Speeds and Pedestrian Injuries. Washington, D.C.: National Highway Traffic Safety Administration, U.S. Department of Transportation. Accessed at: <http://www.nhtsa.gov/people/injury/research/pub/HS809012.html>

¹² Conor, C, Reynolds, O, Harris, MA, Teschke, K, Crompton, PA and M Winters (2009). The impact of transportation infrastructure on bicycling injuries and crashes: a review of the literature. *Environmental Health*, 8: 47.

¹³ Lorenc, T, Clayton, S, et al. (2012). Crime, fear of crime, environment, and mental health and wellbeing: Mapping review of theories and causal pathways. *Health and Place*, 18: 757-765.

¹⁴ Stafford, M, Chandola, T, and M Marmot (2007). Association between fear of crime and mental health and physical functioning. *American Journal of Public Health*, 97(11): 2076-2081.

¹⁵ Whitley, R, and M Prince (2005). Fear of crime, mobility and mental health in inner-city London. *UK Social Science & Medicine*, 61(8): 1678–1688.

¹⁶ Lorenc, Clayton, et al. (2012).

¹⁷ RAND Health Research Highlights (2005). Does Neighborhood Deterioration Lead to Poor Health? Accessed at: http://regionalcommunityhealth.pbworks.com/f/RAND_RB9074.pdf

¹⁸ Van Dyck et al. (2013). Environmental perceptions as mediators of the relationship between the objective built environment and walking among socioeconomically disadvantaged women. *International Journal of Behavioral Nutrition and Physical Activity* 10: 108. Accessed at: <http://www.ijbnpa.org/content/10/1/108>

¹⁹ Welsh, BC, and DP Farrington (2008). Effects of improved street lighting on crime. *Campbell Systematic Reviews*, 13.

²⁰ Ibid.

²¹ Lorenc, Clayton, et al. (2012).

Mental Wellbeing

Summary of Key Findings

Residents report that they feel stressed and worried in their daily lives due to a number of environmental factors:

- Strong odors and loud noises generated by industries and trains are a daily presence in the neighborhoods.
- Trains crossing streets at railroad crossings often stop vehicular and pedestrian traffic, impeding residents' ability to get to their destinations.
- Heavy trucks use residential streets to serve businesses, including streets adjacent to elementary schools.
- Perceptions about crime and safety impact residents' movements around their neighborhoods.
- Perceptions about pollution linger despite substantial environmental cleanup activities.
- The pending I-70 highway reconstruction and other large redevelopment projects add to residents' stress, since any impacts of construction are still unknown.

Responding to these factors on a daily basis can lead to feelings of anxiety, irritability, distress and mental fatigue.

How the Neighborhood Plans Can Improve Mental Wellbeing

Reductions in noise and odor pollution, improvements in street connectivity and pedestrian safety, increased lighting, and positive additions such as new retail goods and services can lead to improvements in residents' mental wellbeing, without which negative impacts to mental wellbeing are likely to persist.



Mental Wellbeing

People react to environmental stressors in different ways, and what is considered stressful to one person may not be for another person. However, environmental factors are considered to be stressors when three elements are present: 1) a person has a physiological reaction to the stressor (for example, blood pressure or pulse increases); 2) the person would avoid the stressor if they could; and 3) the person has no control over the stressor.¹

The challenging conditions in environmental quality, connectivity and mobility, access to goods and services, and community safety in the neighborhoods – discussed in previous chapters – can lead to a feeling of lack of control of one’s daily environment, and can contribute to stress and poor mental health for residents.² Discussions with community health promotion workers who interact with residents on a regular basis provide glimpses of the challenges that residents of Globeville and Elyria Swansea face in their daily lives (Figure 34):

FIGURE 34:
Interviews with Community Health Promotion Workers in Globeville and Elyria Swansea

Bad odors and pollution

- “There’s the train, and Purina, and the rendering plant...it smells pretty [bad] in the summertime. It’s been an issue for a long time.”
- “We’ve had all kinds of [pollution sources]; the steel mill, the railroads, the industries, and now the marijuana (grow)houses...”
- “People don’t let their children play outside because of the air pollution and odors. People don’t want to jog in unclean air.”
- “I’ve heard there are all kinds of pollutants here, I don’t know if it’s true, but I hear that from people. People say that there is still contaminated soil because residents didn’t trust EPA to come on their property and clean it up.”

Noise from trains and trucks

- “You can hear the trains three times in the middle of the night, every night, at 1:30, 3:20, and 4:10...that’s not good for kids.”
- “We worked with [business] to change their truck routes from near the school, but that just pushed the trucks a few blocks east, which is still residential neighborhoods. That creates a lot of traffic and noise.”

Graffiti/vandalism/auto thefts

- “There is a lot of graffiti on public buildings and houses. People don’t want to come out at night because they don’t feel safe. A car was broken into during the daytime in [our] parking lot...I see the concern.”

Public Drug Use

- “People who use drugs hang out in the parks... Even if a park was right in front of your house, you wouldn’t let your children go out and play, which is pretty sad.”

Lack of connectivity/barriers including RR tracks, dead ends, I-70

- “If you have to go somewhere you have to either cross the highway, the RR tracks, or industrial. It isn’t adequate for people to walk around too much, except close to their house.”
- “You just can’t get there...there are so many barriers. The railroad tracks are not safe to cross; there have been serious accidents.”

Lack of sidewalks

- “You have [moms] pushing kids in strollers and all of a sudden the sidewalk ends and they’re pushing strollers in the street.”
- “[because of poor lighting], people are afraid of crime and don’t like to be out at night.”

Lack of healthy food

- “We have corner stores but the prices of vegetables and good foods are higher and there’s not a lot of variety. Also, there is old food that has expired.”
- “Lots of households only have one car; if the husband takes it to work, the wife can’t get to the grocery store. It’s too far and inconvenient on RTD to get to a grocery store...it becomes a field trip just to get groceries.”

Major construction coming including I-70 and stock show:

- “People are extremely worried and feel a huge amount of stress about the I-70 highway construction ...they don’t know if the government is going to take their property. They don’t trust the government. ... people just don’t know what’s going to happen. They don’t want to spend money to make their yards look nice if their house will be demolished.”
- “You have so many projects and programs going on in this neighborhood that it is really confusing for the normal person to take it all in and keep it straight.”

SOURCE: Denver Department of Environmental Health 2014

Mental Wellbeing continued

Given these neighborhood elements that contribute to stress, those things that relieve stress and promote feelings of wellbeing become even more important to strengthen. Residents cite a feeling of strong community cohesion due to a stable longtime population (some going back generations), knowing their neighbors, and the unique character of both neighborhoods as valuable assets. They mention the schools, churches, recreation centers, parks (Argo Park), and The GrowHaus (a nonprofit greenhouse and education center) as places that they feel safe to gather, spend time together, and get to know their neighbors.



How Mental Wellbeing Affects Health

Mental health describes a level of psychological well-being. The World Health Organization (WHO) defines mental health as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively...and is able to make a contribution to his or her community.”³

The built environment can promote or hinder mental health.⁴ The quality and characteristics of the settings we inhabit – the places in which we live, work, and play – influence our mental health.⁵ Well-maintained, safe places with exposure to green space promote positive feelings of wellbeing. Conversely, places that are dangerous, crowded, and dark or lack exposure

to natural settings can lead to irritability, anxiety and distress.⁶ Studies have shown that such environments can impact the cardiovascular, endocrine, and central nervous systems.⁷

Perception is vital in the stress-to-illness process.^{8,9} Those who live in neighborhoods with physical deterioration or crime may spend much more time worrying about their personal safety on a daily basis than those who live in neighborhoods without those factors. If one feels a lack of control over one’s environment, or doesn’t have sufficient coping resources to deal with those feelings, stress may result at sufficient levels to produce negative physical health outcomes.^{10,11}

Prediction: How the Neighborhood Plans Can Affect Mental Wellbeing

Residents of Globeville and Elyria Swansea experience numerous challenges to their sense of mental wellbeing due to physical conditions in the neighborhood.

The recommendations of the neighborhood plans have great potential to alleviate many of these conditions. An improved street grid and zoning to separate industrial users from residents can reduce noise and odors and create an environment that is more inviting for outdoor activities. Creating connectivity through a

more complete street grid will help with traffic safety, appropriate trucks routes, access to goods and services, and pedestrian and bike safety for adults and children.

Other improvements such as improving the street lighting can serve to reduce criminal activity and increase residents’ sense of safety and security in their neighborhood. An increased sense of personal safety can lead to more physical activity as adults and children spend more time outside, walking and playing.

Recommendations to Improve Mental Wellbeing

Health Recommendations that Can Be Addressed by the Globeville and Elyria Swansea Neighborhood Plans

1. Connect streets as prioritized in the Globeville and Elyria Swansea Neighborhood Plans' "Street Grid Connectivity Map" (See Section 8, Recommendation 3.A)
2. Explore solutions to reduce the negative health impacts from trains. These could include "Quiet Zones" or grade separation of trains from other modes of transportation. (See Section 8, Recommendation 7.A)
3. Minimize negative impacts of industrial uses on residential neighborhoods through land use designation, buffering, or other means. (See Section 8, Recommendation 1.A)
4. Prioritize street infrastructure improvements, including sidewalks, bike lanes, bus stop furnishings, and intersection. (See Section 8, Recommendation 2.A)

5. Install new and upgraded street lighting. (See Section 8, Recommendation 15.A)
6. Review truck routes in the neighborhoods to improve environmental quality, safety and connectivity. (See Section 8, Recommendation 11.A)
7. Enforce regulations regarding graffiti, vandalism, public drug use, stray animals and property maintenance to increase safety. (See Section 8, Recommendation 21.A)

Health Recommendations that Can Be Addressed by Other Means by the City, private sector, or nongovernmental organizations

8. The City and community partners should continue and strengthen bilingual and culturally appropriate outreach and communication with residents about upcoming public construction and development. (See Section 8, Recommendation 10.B)

References & Endnotes

- ¹ Dr. Carl Clark, Executive Director of the Mental Health Center of Denver (2014). "Overview of the Built Environment" roundtable, North Denver Cornerstone Collaborative Mid-Year Town Hall Meeting, July 22, 2014.
- ² Tenney, M (2014). Stress and the Built Environment Key Informant Interviews in Globeville and Elyria Swansea, February 2014.
- ³ World Health Organization (2014). Mental health: strengthening our response (Fact sheet N°220). Accessed at: <http://www.who.int/mediacentre/factsheets/fs220/en/>
- ⁴ Dannenberg, A, Frumkin, H, and R Jackson (2011). Making Healthy Places. Washington, D.C.: Island Press, p. 106.
- ⁵ Ibid., p. 107.
- ⁶ Ibid., p. 108.
- ⁷ Cohen, S, Hamrick, N, Rodriguez, MS, Feldman, PJ, Rabin, BS, and SB Manuck (2000). The stability of and intercorrelations among cardiovascular, immune, endocrine, and psychological reactivity. *Annals of Behavioral Medicine*, 22: 171-179.
- ⁸ Lazarus, R, and S Folkman (1984). Stress, Appraisal, and Coping. New York: Springer Publishing Company.
- ⁹ Cohen, S, Hamrick, N, Rodriguez, MS, Feldman, PJ, Rabin, BS, and SB Manuck (2000). The stability of and intercorrelations among cardiovascular, immune, endocrine, and psychological reactivity. *Annals of Behavioral Medicine*, 22: 171-179.
- ¹⁰ Aneshensel, CS (1992). Social stress: Theory and research. *Annual Review of Sociology* 18: 15-38.
- ¹¹ Kobasa, SC (1979). Personality and resistance to illness. *American Journal of Community Psychology*, 7: 413-423.



Recommendations

A. Health Recommendations To Be Included in the Globeville and Elyria Swansea Neighborhood Plans

A = air quality **O** = Odors **N** = Noise **W** = water **S** = soil **CM** = connectivity and mobility **CS** = goods and services access
CS = community safety **MW** = mental wellbeing

SECTION OF HIA REPORT		# IN REPORT	RECOMMENDATION	LEAD AGENCY/ PARTNERS		
A	O	N	MW	1.A	Minimize negative environmental impacts on residential neighborhoods from industrial uses through methods such as land use designation, zoning, buffering, or other means.	CPD
			CM	2.A	Prioritize street infrastructure improvements, including sidewalks, bike lanes, bus stop furnishings, and intersection crossings, to achieve the goals of the 2014 City Council Priorities, Denver Moves (2011) and the Strategic Transportation Plan (2008).	CPD/ PW
			CM	3.A	Connect streets as prioritized in the Globeville and Elyria Swansea Neighborhood Plan “Street Grid Connectivity Map.”	CPD/ PW
			CS	4.A	Explore measures to reduce the incidence of pedestrian and bicycle injury crashes at locations where multiple crashes have occurred. Such locations may include ‘gateway intersections’ such as 47th & York and 47th & Brighton Blvd. in Elyria Swansea, and 45th & Washington and 51st & Washington in Globeville.	DPD/ PW CPD
		N		5.A	Noise in residential areas and schools near major roadways and highways should be mitigated to no more than 55 decibels, where feasible. ¹	DEH/ PW CDOT/ CPD
		N		6.A	Sound walls or other noise mitigation measures are recommended along major roadways and highways where sound levels at schools ² and homes ³ are expected to increase by 5 decibels or more, or exterior noise levels are expected to be 55 decibels or greater, or interior noise levels are expected to be 45 decibels or greater. ⁴ Community preferences regarding aesthetic qualities of sound mitigation should be considered.	DEH/CPD/ PW/ CDOT
		N	CS	7.A	Explore solutions to reduce the health impacts from trains. These could include “Quiet Zones” (intersections specifically designed so that trains do not have to sound horns), or grade separation of trains from other modes of transportation (i.e., roads constructed over or under tracks to eliminate the need for trains to sound horns at these crossings and to aid in the prevention of people and trains crossing paths). One intersection to explore for potential modification includes the train crossing at 47th St. & York St.	PW/CPD/ CW Montero/ Railroads

A. Health Recommendations To Be Included in the Globeville and Elyria Swansea Neighborhood Plans

A = air quality **O** = Odors **N** = Noise **W** = water **S** = soil **CM** = connectivity and mobility **GS** = goods and services access
CS = community safety **MW** = mental wellbeing

SECTION OF HIA REPORT		# IN REPORT	RECOMMENDATION	LEAD AGENCY/ PARTNERS
O		8.A	Mitigate the odors and emissions from marijuana grow facilities on residential neighborhoods through methods such as land use designation, siting, buffering, or other means.	CPD/DEH
	CM GS	9.A	Improve connectivity to parks, trails and recreation, especially to the South Platte River trails and parks.	CPD/Parks/ PW
	GS	10.A	Incentivize development of retail goods and services, including a grocery store.	OED/DEH
A	N CM CS	11.A	Review truck routes in the neighborhoods to improve environmental quality, safety and connectivity. Examine current truck routes, particularly adjacent to schools; explore potential modifications as necessary; and make any needed changes to the City truck route ordinance for consistency with state regulations.	CW Montero/ PW/DPD
	CM	12.A	Improve access and connectivity to and through residential neighborhoods and the redeveloped National Western Center.	CPD/PW NWC
	GS	13.A	Implement "Complete Streets" including sidewalks for all new and redesigned streets, to provide safe and convenient access for all users (per existing City Policy #26, adopted May 2011).	PW/CPD
	CM	14.A	Improve connectivity and safety in School Zones. Improvements could include analyzing current School Zones and making modifications as necessary, including Safe Routes to School best practices. Improve education and outreach about safety in School Zones to residents, drivers and schoolchildren, particularly in alignment with the upcoming I-70 reconstruction.	CW Montero/ DPD/PW/ CPD
	CS MW	15.A	Install new or upgraded street lighting per the recommendations of the Denver Police Department lighting survey, particularly along new sidewalks, to increase safety and reduce crime. Encourage residents' use of porch lights at night with education and outreach efforts.	DPD/PW/ CPD/ NGOs
	GS	16.A	Promote new sources of healthy foods within the redeveloped National Western Center, such as grocery stores, farmers markets, and community gardens.	DEH/ NWC
	GS	17.A	Implement a "healthy corner store retail program" in the neighborhoods, similar to the Philadelphia model, to add healthy foods to existing convenience and corner stores.	DEH

Recommendations continued

A. Health Recommendations To Be Included in the Globeville and Elyria Swansea Neighborhood Plans

A = air quality **O** = Odors **N** = Noise **W** = water **S** = soil **CM** = connectivity and mobility **GS** = goods and services access
CS = community safety **MW** = mental wellbeing

SECTION OF HIA REPORT		# IN REPORT	RECOMMENDATION	LEAD AGENCY/ PARTNERS
	GS	18.A	Promote mixed use development to support a variety of commercial and retail businesses and services throughout the community and around new rail stations.	CPD
	GS	19.A	Develop a flexible market space that can support a variety of neighborhood goods and services and culturally relevant activities.	CPD/ NGOs
A	W	20.A	Increase the tree canopy cover and green infrastructure as prioritized in the Denver Urban Forestry Program and The Game Plan, including planting street trees, to improve environmental quality.	Parks/CPD
	CS	21.A	Enforce regulations regarding graffiti, vandalism, public drug use, stray animals and property maintenance to increase safety.	DPD/DEH/CPD CW Montero
	CS	22.A	Increase education and outreach to citizens about pedestrian safety, in anticipation of increased pedestrian activity with the redevelopment of the National Western Center and other projects.	DPD/NGOs
	S	23.A	Work with community partners to provide education to residents about best practices for backyard gardening.	DEH/CSU/ DUG/NGOs
A	O N	24.A	DEH staff should continue to participate in public sector development projects in Globeville and Elyria Swansea, including the I-70 reconstruction and the National Western Center, to help anticipate health and environmental conditions of concern such as those identified in the HIA.	DEH/NDCC
	W S	25.A	Encourage developers to use low impact development and green infrastructure techniques in new development and redevelopment in the Globeville and Elyria Swansea neighborhoods to enhance water quality in each basin. Examples include use of bioretention (rain gardens), bioswales, or vegetated buffer strips to minimize directly connected impervious areas. Roadway and alley projects should include 'green street' techniques such as stormwater planters, stormwater curb extensions, tree trenches, and permeable pavers.	DEH/PW
	W	26.A	Implement recommendations from the River North Greenway Master Plan to improve water quality (where possible, use existing park areas without affecting existing uses, to incorporate water quality treatment features such as wetlands, to restore wildlife habitat along the river or in Heron Pond).	DEH Parks/PW

B. Health Recommendations that Can Be Addressed by Other Means (by the City, private sector, or nongovernmental organizations):

A = air quality **O** = Odors **N** = Noise **W** = water **S** = soil **CM** = connectivity and mobility **GS** = goods and services access
CS = community safety **MW** = mental wellbeing

SECTION OF HIA REPORT		# IN REPORT	RECOMMENDATION	LEAD AGENCY/ PARTNERS
A	N	1.B	In advance of the I-70 reconstruction project through Globeville and Elyria Swansea: a. DEH should work with CDOT and CDPHE to define types of air pollution monitoring that can be done to determine a community baseline. b. DEH should work with CDOT and other stakeholders to recommend air quality mitigation measures that may be required during the reconstruction of I-70, including upgrading the heating/ventilation/air conditioning (HVAC) system at Swansea Elementary School to improve indoor air quality. c. The City should work with CDOT to mitigate noise impacts of the I-70 reconstruction during the construction period.	DEH/CDOT/ CDPHE
A	O	2.B	Explore the feasibility of an environmental plan review process prior to approval of future development applications in order to minimize conflicts between industrial and residential uses.	DEH/CPD
A		3.B	Continue to improve the City's air quality through specific actions including: a. DEH should update its community air pollution modeling assessment to a 2011 baseline, and make projections for a future year (such as 2025). b. DEH should work with CDPHE and EPA to establish an additional air quality monitoring station in Globeville or Elyria Swansea by 2015, with a goal of quantifying near-highway pollution separately from the I-70 project.	DEH/CDPHE/ EPA
	O	4.B	Analyze the distribution of current marijuana grow facilities and determine any excessive odor burdens generated by such facilities in Globeville and Elyria Swansea, and make recommendations to mitigate odor impacts as needed, including best management practices and technologies.	DEH
	O	5.B	Advocate for further research on the potential human health impacts from marijuana grow facilities, as such impacts are unknown. Concerns include emissions to air, odors, mold, and discharges to the water system.	NGOs/DEH

Recommendations continued

B. Health Recommendations that Can Be Addressed by Other Means (by the City, private sector, or nongovernmental organizations):

A = air quality **O** = Odors **N** = Noise **W** = water **S** = soil **CM** = connectivity and mobility **GS** = goods and services access
CS = community safety **MW** = mental wellbeing

SECTION OF HIA REPORT		# IN REPORT	RECOMMENDATION	LEAD AGENCY/ PARTNERS
O		6.B	Address nuisance odors through specific actions including: a. DEH should work with City agencies, other government, non-profit, community and industry partners to form a long-term steering committee to implement solutions to reduce odors, potentially including recommendations for local and state policy changes. b. DEH should create and lead a community partnership of interested organizations to pursue funding for research on manufacturing processes that produce odors, and odor monitoring technologies to address nuisance odors in Globeville and Elyria Swansea. c. DEH should continue its work with the Northeast Metro Pollution Prevention Alliance (NEMPPA) to cooperate on potential solutions for odor reduction from industries located outside of City boundaries.	DEH/ Partner Agencies
	W	7.B	DEH should partner with other agencies and organizations to improve education and outreach to businesses and residents related to water quality in Globeville and Elyria Swansea, including providing information to developers about City regulations for stormwater runoff and fugitive dust and dirt.	DEH/CPD/ NGOs
	S	8.B	DEH should work with the EPA to continue to take steps to remove the residential portion (Operable Unit 1) of VB/I-70 from the Superfund site (i.e., de-list OUI), as the remedy has been completed.	DEH/EPA
	CS	9.B	The City and private developers should work together to encourage crime prevention and safety through the use of environmental design principles for new development and redevelopment, including large projects such as the National Western Center.	DPD/CPD/ NWC
	MW	10.B	The City, private developers and community partners should continue and strengthen bilingual and culturally appropriate outreach and communication with residents about upcoming construction and development projects, as these communities have historically experienced negative environmental impacts from previous decisions.	NDCC/CPD/ PW/CDDOT/ RTD

¹ U.S. Environmental Protection Agency, <http://www.nonnoise.org/library/levels/levels.htm#summary>

² Schools are classified as CDOT “Category C” receptors, <http://www.coloradodot.info/programs/environmental/noise/guidelines-policies/final-cdot-noise-guidance-2013>, p. 15.

³ Residential uses are classified as CDOT “Category B” receptors, <http://www.coloradodot.info/programs/environmental/noise/guidelines-policies/final-cdot-noise-guidance-2013>, p. 15.

⁴ U.S. Environmental Protection Agency, <http://www.nonnoise.org/library/levels/levels.htm#summary>

Reporting

This HIA report is the final reporting product of the HIA process. It has been made publicly accessible on the website www.behealthydenver.org. A limited number of copies of the full report have been printed. Other reporting products include the following:

1. A draft HIA was available for public comment from April 18 to May 12, 2014 online at <http://www.denvergov.org/cpdCommunityPlanningandDevelopmentPlanningandDesign/PlansinProgressGlobevilleNeighborhoodPlan/tabid/443230Default.aspx>. Public comments were accepted online via a dedicated email address. Public comments were addressed as needed in the HIA final report, and a formal written record of HIA report revisions was recorded and can be found online in the Appendices of the final report, at www.behealthydenver.org.

2. Executive Summary and Recommendations (English): posted online at www.behealthydenver.org and printed.
3. Executive Summary and Recommendations (Spanish): posted online at www.behealthydenver.org and printed.

Thus far, the HIA findings or recommendations have been used to inform Denver's 2014 Climate Adaptation Plan and the City's application for accreditation with the Public Health Accreditation Board. Further, it is anticipated that HIA findings will be included in public comments on the I-70 East Supplemental Draft Environmental Impact Statement in October 2014.

Monitoring and Evaluation Plan

The recommendations of this HIA should be monitored to ensure implementation by City agencies and other organizations, and to evaluate the short-, intermediate-, and long-term health impacts of the recommended actions as identified in the pathway diagrams (*Figures 9 and 10*).

Denver Environmental Health intends to monitor the progress of implementation of recommendations, and report that progress on a regular basis to stakeholders. Each recommendation has a lead agency assigned for implementation, and supporting agencies or organizations.

Changes in short-, intermediate-, and long-term health impacts should also be included in the progress reporting.

In addition to the health impacts, Denver Environmental Health intends to evaluate the effectiveness of the HIA process, including how the decision-making process was informed, any new capacity built among partners to consider health in future land use and transportation planning decisions, and any new partnerships established as a result of the HIA.

Conclusion and Next Steps

This Health Impact Assessment is an effort to address the community health factors that can be impacted by the Neighborhood Plans for Globeville and Elyria Swansea. The HIA findings highlight current health impacts of factors including environmental quality and physical infrastructure, and predict future health impacts that can result with the planning and development that is envisioned in the Neighborhood Plans.

The information and recommendations in this HIA are being incorporated into each of the Neighborhood Plans for Globeville and Elyria Swansea, which are anticipated to be adopted by the Denver City Council in late 2014 and early 2015. The Neighborhood Plans have the potential to create lasting positive impacts to health and wellness for years to come for residents, workers and visitors to these historic North Denver neighborhoods.

The findings of this HIA are designed to be used to inform future plans, policies or projects in Globeville and Elyria Swansea as well, such as the I-70 reconstruction, redevelopment of the National Western Center, new opportunities for access to healthy food, development of the South Platte River greenway, the opening of new rail transit stations, and other investment in the communities. Stakeholders including City departments, other agencies, local nonprofits, and community groups can work independently or together to implement the various recommendations; indeed, some activities are already underway. Implementation of these HIA recommendations will likely result in community design that contributes to better health for current and future residents of these neighborhoods.

Methodology and Limitations

This HIA used a mixed methods research approach, employing both quantitative and qualitative data including surveys, interviews, and health surveillance datasets. Some primary data were collected, and secondary data (surveys and listening conversations) were shared by local nonprofit and community organizations.

As with most HIAs, there were limitations in resources and data. The sample sizes in some of the surveys were small. The survey respondents were often self-selected versus randomized. The key informant interviews were conducted in an attempt to balance this limitation and collect more in-depth data.

Finally, the HIA used the Neighborhood Plan steering committees as guiding entities rather than selecting a separate HIA steering committee. Because the communities have small populations, it may have been unreasonable to invite residents to attend dual sets of steering committee meetings for two projects that were closely related.



Denver Environmental Health is committed to environmental responsibility. This report is printed on recycled paper.

Photos courtesy of Denver Environmental Health

www.behealthydenver.org

© Denver Environmental Health



DENVER
ENVIRONMENTAL HEALTH

Be Healthy **Denver**

COMMUNITY HEALTH MATTERS