City of Medford –Jefferson Elementary School Baseline Data Evaluation Report

FINAL July 27,2022

Introduction

This case study evaluation measures the impacts of Oregon Safe Routes to School (SRTS) 2021 Competitive Construction Grants in communities across the state. The evaluation will assess the effectiveness of individual SRTS projects, techniques, and programs designed to reduce barriers to biking and walking to and from school. Evaluation research questions include:

- What are the impacts for standalone construction grants, and combined outreach and education and construction grants?
- How do different combinations of interventions effectively address the barriers identified by communities and affect mode shift; safety; and perceptions of safety, program lifespan, and equity?

This Baseline Data Evaluation Report represents the "pre-construction" data and provides an overview of existing travel conditions and school site attributes. This report summarizes the funded improvement project, demographics of affected schools, and data from Oregon Department of Transportation (ODOT) and local roadway authority crash records, caregiver surveys, and student travel hand tallies. It is intended to contain the majority of the information needed to plan for the post-construction data collection.

Plan for the Final Case Study Evaluation Report

The Final Case Study Evaluation Report will represent the "post-construction" data. A draft outline for this report is included in Appendix A. For data consistency, the post-construction data will be collected as soon as possible after construction is complete, likely starting in spring 2024. This will reduce weather-related impacts and also allow time during the school year for families to establish or change their travel habits. In addition to the standard caregiver surveys and student travel hand tallies, post-construction data collection methods for the evaluation report may also include caregiver focus groups and surveys or interviews with school staff.

The Final Case Study Evaluation Report will measure shifts using the evaluation metrics laid out in this document to identify the successes of SRTS projects and provide insight on opportunities for further improvement. SRTS performance metrics measured during this evaluation process will include:

- **Mode split:** Are more students walking and biking to school after a project's completion than at the time of baseline data collection?
- **Access to safe infrastructure:** Do students have better access to sidewalks, bike lanes, or safe crossing locations on their route to school after the completion of the project?
- **Safety/perception of safety:** Do caregivers and students feel safer or more comfortable walking and biking to school after the project's completion?
- **Program lifespan/partnerships:** Is the SRTS program functioning efficiently and providing adequate support for partner jurisdictions, schools, and districts?
- **Equity:** Are students from a diversity of ethnic/racial and socioeconomic backgrounds benefiting from the investments being made?

In addition to reporting on grant effectiveness, data presented in the Baseline Data Evaluation Report and the Final Case Study Evaluation Report could be used for a variety of transportation and program planning purposes at the local level. Having a comprehensive set of quantitative data and qualitative feedback on transportation conditions and trends around these sites could help inform decisions on school/district policy, SRTS event and program planning by schools/districts/local jurisdictions, and planning for future infrastructure projects, as well as providing supporting documentation for future grant applications.

Baseline SRTS Snapshot: Jefferson Elementary

Summary

Jefferson Elementary School is a public-school enrolling student in grades K-6, more than 95% of whom qualify for the Free and Reduced-Price Lunch Program. The school is ethnically- and racially-diverse, with a student body that is 56% white and 33% Hispanic. Additionally, 16% of Jefferson students are registered as Ever English Learners.[1] City staff identified Jefferson Elementary School as a site for SRTS improvements due to an unsafe crossing near the school. Garfield Street is a minor arterial street with s sidewalk on the south side only. Students living south of Garfield St have to cross an unsafe road to get to school and the parks adjacent to the school.

The Oregon SRTS 2020 Competitive in Construction Grant funds a Rectangular Rapid Flashing Beacon (RRFB) at the existing school crosswalk at the intersection of Garfield Street and Kenyon Street.

Safe Routes to School is a new program for Medford. Action Plans are in development and objectives will include increasing the percentage of students walking or rolling to school in conjunction with implementing a sustainable education program with our physical education (PE) teachers Student Wellness is also excited to incorporate Safe Routes to School programming at events district wide.

Key information from caregiver surveys:

- 75% of students live within one mile of school; 0% of students live more than two miles from the school.
- Riding in a family vehicle was the most common way to get to/from school, but an average of 11% of students walk and 31% take the school bus.
- Among surveyed families who live within a quarter mile of school, 80% of all trips reported were by active modes.
- Six caregivers reported that they wouldn't allow their student to take the school bus, while only one said they could take the school bus by themselves.
- Caregivers reported the most common barriers to walking/biking to school include:
  - Poor driver behavior
  - Convenience of driving
  - Concerns about personal safety, documentation or criminal activity
  - Time it takes to walk or bike
- Eight out of eight surveyed caregivers felt walking or riding a bike was fun and healthy for their student.

[1] Number of students who have been served or were eligible for an English language development program during 2018-19 or at any time in the past. Oregon Department of Education 18-19 SY collected May 1, 2022.

Contact Information

JURISDICTION:	City of Medford
CONTACT:	Karl MacNair, karl.macnair@cityofmedford.org
SCHOOL DISTRICT:	Medford School District
CONTACT:	City of Medford: (541) 499-1343
OTHER CONTACTS:	Julie Van Horn, SRTS Coordinator: (541) 842-3615

Enrollment and Demographics

Jefferson Elementary School is a public-school enrolling student in grades K-6, 91% of whom qualify for the Free and Reduced-Price Lunch Program. The school is ethnically and racially diverse, with a student body that is 56% white and 33% Hispanic. Additionally, 16% of Jefferson students are registered as Ever English Learners.[1]

ENROLLMENT: 407[2]

GRADE LEVELS SERVED AND SCHOOL TYPE: K-6th, Public

STUDENT ETHNIC/RACIAL DEMOGRAPHICS:

American Indian/Alaska Native: 1%
Asian: 0%
Hispanic or Latino: 37%
Native Hawaiian/Pacific Island: 0%
Multiracial: 4%
Black/African American: 1%
White: 58%

PREDOMINANT LANGUAGES SPOKEN IN

MEDFORD SCHOOL DISTRICT:[3]

English: 11552
Spanish: 2157
Samoan: 33
Tagalog:21
Vietnamese:18
Thai: 10
Chinese:10

STUDENTS LIVING WITHIN 1 MILE OF SCHOOL: NA

TITLE 1 STATUS: NA[4]

EVER ENGLISH LEARNERS: 21[5]

FREE AND REDUCED-PRICE LUNCH ELIGIBILITY: 27%[6]

---

[1] Unless otherwise noted below, demographic data are from the Oregon Department of Education Fall Membership Report SY2020-2021 Data, https://www.oregon.gov/ode/reports-and-data/students/Pages/Student-Enrollment-Reports.aspx

[2] Oregon Department of Education, SY 2020-2021 https://www.ode.state.or.us/data/reportcard/Media.aspx

[3] Oregon Department of Education Language Use Survey, SY 2020-2021 https://www.oregon.gov/ode/schools-and-districts/grants/ESEA/EL/Pages/LanguageUseSurvey.aspx

[4] Title 1 schools are schools where 40% or more of students are enrolled in USDA's Free and Reduced-Price Meals Program. Oregon Department of Education, SY 2018-2019 https://www.oregon.gov/ode/schools-and-districts/reportcards/reportcards/Pages/Accountability-Measures.aspx

[5] Oregon Department of Education, SY 2020-2021 https://www.ode.state.or.us/data/reportcard/Media.aspx

[6] Oregon Department of Education, SY 2020-2021 https://www.oregon.gov/ode/students-and-family/childnutrition/cacfp/Documents/Site%20Eligibility%20for%20CACFP%20and%20SFSP.pdf

Community Context and Place Type – Jefferson Elementary School

Place type describes attributes of a built environment, including: access to destinations, density, walkability, mixing of uses, and presence of transit. The evaluation team compiled Oregon Department of Land Conservation and Development's (DLCD) measures of place type for each community studied. Each attribute is rated as "Very Low, Low, Medium, or High" by block group. Place type characteristics provide important context for transportation opportunities and challenges in a community and influence the transportation

Jefferson Elementary is located in the City of Medford, and the block group encompasses a small area within the city limits. According to the Place Type Tool, the area surrounding Jefferson Elementary School is categorized as Employment, meaning land use is dominated by commercial or industrial activities, low diversity of land uses, jobs/Housing balance: mostly jobs. With 2,106 people residing and 2,604 people working within the census block group, the area has a medium level of access to regional employment centers and destinations, and a high mix of uses; however, the overall level of street connectivity and access to transit in the area is characterized as "low."

AREA TYPE describes the role of each neighborhood district compared to the rest of the region (regional center, close-in community, suburban/town, low density/rural)	Employment • Land use is dominated by commercial or industrial activities • Low diversity of land uses • Jobs/Housing balance: mostly jobs • Missing either the density or street design required of mixed use
DEVELOPMENT TYPE describes more detailed physical characteristics of each neighborhood (transit supportive development, mixed use, employment, residential, rural/ low density):	Residential • Land use is dominated by housing • Low diversity of land uses • Jobs/Housing balance: mostly housing • Missing either the density or street design required of mixed use
JURISDICTION POPULATION (ACS 5-YEAR ESTIMATES):	City of Medford 82,098 people
CENSUS BLOCK GROUP POPULATION (2010):	2,106 people
NUMBER OF JOBS IN CENSUS BLOCK GROUP (2010):	2,604 jobs
ACCESS TO DESTINATIONS - describes the number of regional jobs within 5 miles:	Medium
DENSITY LEVEL- jobs and households per acre within ¼ mile:	Low
DESIGN LEVEL- level of street connectivity, pedestrian-oriented street density:	Very Low
DIVERSITY LEVEL- Mix of housing and employment:	High
TRANSIT LEVEL- Afternoon peak hourly transit service within ¼ mile:	Low

Project Description

A map of the project improvements from the City of Medford grant application is included in Appendix B. The following information was provided by the community in their Competitive SRTS Construction Grant application.

PROBLEM STATEMENT:	Jefferson School sits north of Garfield St on Kenyon St, Holmes Ave, and Holly St, Garfield Street is a minor arterial street with sidewalk on the south side only. Students living south of Garfield St have to cross to get to school or the parks adjacent to the school.
DESCRIPTION OF BARRIERS TO WALKING AND BIKING:	The project includes two ADA compliant curb ramps to improve access to the schools for students with disabilities and those walking while biking.
PROJECT DESCRIPTION:	Install a Rectangular Rapid Flashing Beacon (RRFB) at the existing school crosswalk at the intersection of Garfield Street and Kenyon Street.
ESTIMATED PROJECT TIMELINE:	November 2022 Completion
PRIORITY SAFETY CORRIDOR?[7]	Yes
OUTREACH AND EDUCATION:	Safe Routes to School is a new program for Medford. Action Plans are in development and objectives will include increasing the percentage of students walking or rolling to school in conjunction with implementing a sustainable education program with our physical education (PE) teachers. Student tallies and parent surveys were completed for eight schools before closures occurred. PE teachers incorporated pedestrian and bicycle safety last May in place of Bike to School Day. The teachers are excited to continue a consistent program for their students as it relates to PE and healthy choices. At the district level, Student Wellness is also excited to incorporate Safe Routes to School programming at events district wide. We have received citizen requests for crosswalk enhancements at this location and have discussed those at the City's Traffic Coordinating Committee. We have also coordinated with the school district, Medford Police, and the City's Transportation Commission on project selection. The only other public outreach that would be done for this project would be through the school if the project is awarded.

---

[7] A road where the posted speed or 85th percentile speed of traffic is 40 mph or greater OR where two of the following apply: posted speed limit of 30 mph or greater, more than two lanes or a crossing distance greater than 30 feet, 12,000 AADT or greater, or a demonstrated history of crashes related to school traffic.

Access Analysis for Students Walking and Biking to School

Jefferson Elementary School

The project team conducted an analysis to estimate the number of people who would gain walking and biking access to Jefferson Elementary when the project improvements are constructed, shown in Table 1 and Figure 1. First, the project improvements were evaluated to understand the geographic areas that would gain safe access to the school once the funded project was constructed. Next, American Community Survey (ACS) data was combined with zoning data to estimate the number of people and the number of school-age children that live within the new access areas.

This analysis estimates that approximately 85 students, or 12% of the school-aged population living within a mile of the school, would gain safer walking or biking access to the school.

Table 1. Jefferson Elementary Access Analysis Results

METRIC	VALUE
Total Population of New Access Areas	585
School Age Population of New Access Areas[8]	85
Percentage of Students within the School Areas Gaining Access[9]	12%

---

[8] Calculated using the proportion of school-age children (5-17 years old) within the City of Medford.
[9] The school Area is defined as the area within the school enrollment area that is within one mile of the school.

Figure 1. Jefferson Elementary New Access Area for Students Walking and Biking
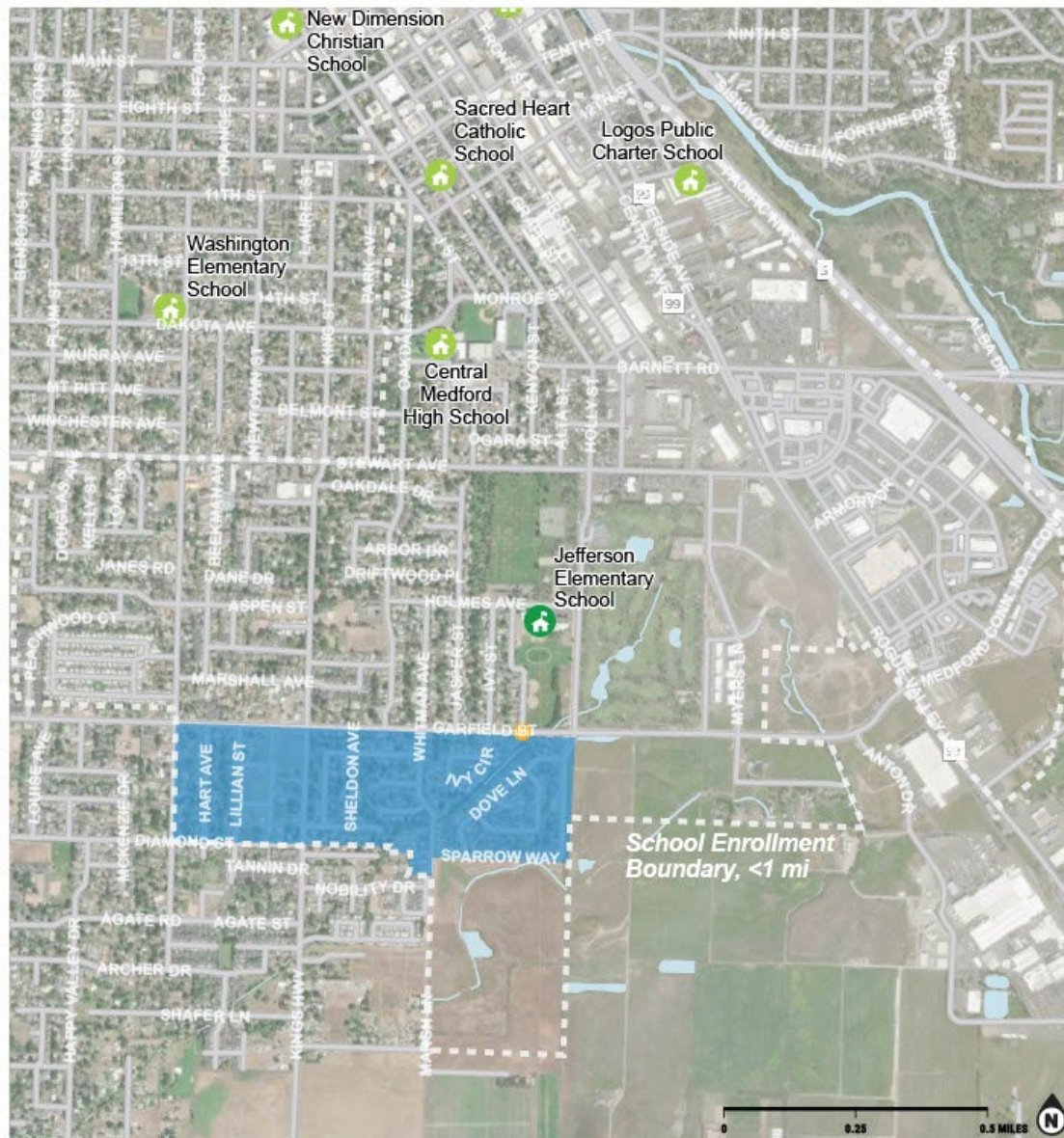
Baseline Data – Jefferson Elementary School

The following section presents pre-construction data, which will be compared against similar data collected after the project has been constructed, in order to estimate the impact of the improvements.

Hand Tallies

|	
DATE COLLECTED:	**February 16, 2022**
DATA COLLECTION PROCESS:	20 classrooms surveyed about their trip to and from school
NUMBER OF STUDENTS:	379 students participated in hand tallies
TRIPS RECORDED	770 trips recorded by the hand tallies

SUMMARY OF DATA COLLECTION AND METHODOLOGY

The February 2022 baseline hand tally data from Jefferson Elementary includes 612 recorded trips collected from 207 students in 17 classrooms. The hand tally process surveyed all students in each classroom on which transportation mode(s) they had used to get to and from school the day of the survey. The Oregon SRTS's hand tally data collection forms and process were used. Jefferson School staff collected the data. Two classrooms did not collect data so 100% of their trips were assumed as family vehicle. This data provides a snapshot of student travel behavior trends.

SUMMARY OF RESULTS

Jefferson Elementary hand tally data from 2022 indicates that a majority of students surveyed ride in a family vehicle in the morning (65%) and in the afternoon (50%) (see Figure 2). School bus was the second most popular travel mode followed by walking. Carpool and other travel modes were used by very few of the students – all under 3% of the mode share.

Figure 2. Student Mode Split by Time of Day, 2022 Student Travel Tally
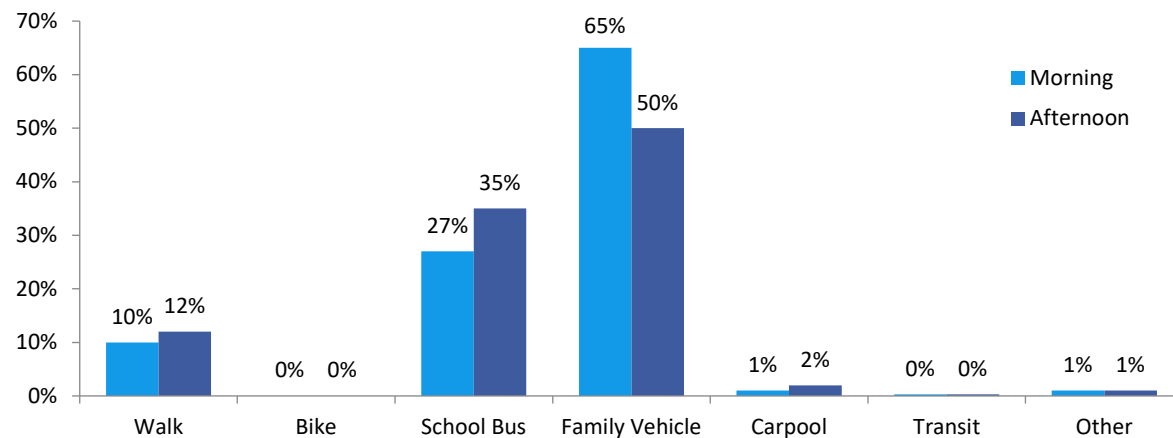
Note: Percentages may not total 100% due to rounding.

Caregiver Surveys

|	
DATE COLLECTED:	**April 2022**
DATA COLLECTION PROCESS:	The Oregon Department of Transportation SRTS caregiver survey was distributed online to caregivers at Jefferson Elementary School to assess family perceptions about school travel options and behavior, with support from Alta Planning + Design for data collection materials and methods.
NUMBER OF SURVEYS:	Eight responses

SUMMARY OF DATA COLLECTION AND METHODOLOGY

The caregiver survey data included in this report was collected from eight caregivers with students attending Jefferson Elementary School. Alta Planning + Design staff created a promotional flier which included details about the Safe Routes to School program, project contact information, a link to the online survey and instructions on where to return hard copies of the paper surveys. Caregivers who completed the survey were entered into a raffle for a walking/biking safety kit. *Note: due to the small sample size, the following charts are provided as raw numbers as they do not provide a representative sample of the total population.*

SUMMARY OF RESULTS

Caregiver survey analysis found that most respondents live within one mile of Jefferson Elementary School (six out of eight), with an additional two living between one and two miles of the school site (see Figure 3). None of the surveyed caregivers lived between a quarter mile and a half mile or more than two miles from Jefferson Elementary School.

Figure 3. How Far Does Your Family Live from School?, 2022 Caregiver Survey
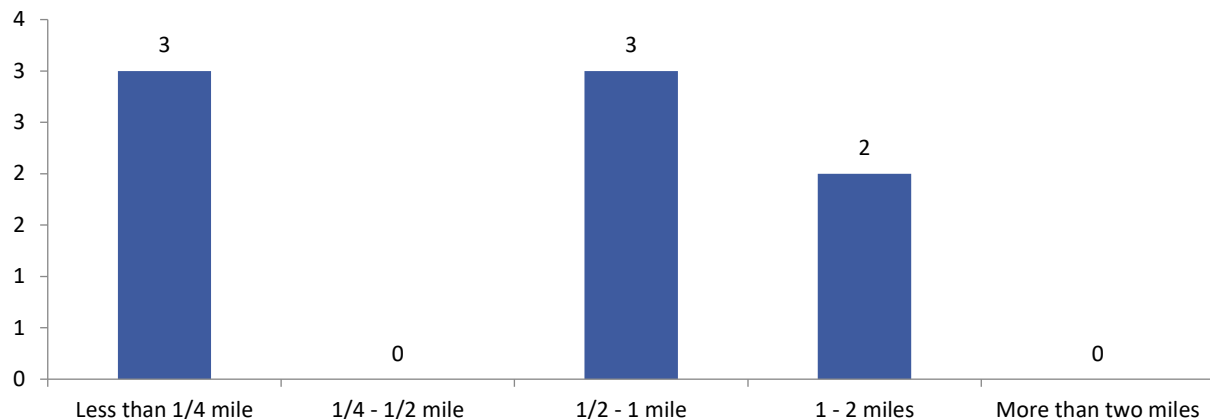
The chosen mode of transportation for survey respondents from Jefferson Elementary School varied depending on how far they live from school. Among those who live less than a quarter mile from campus, 80% of trips were by active modes and the other 20% were by family vehicle. Among students living between a half-mile and a mile from school, one-third of trips were made using active modes (see Figure 4 and Table 2). Family vehicles were the most popular mode for respondents who live between a half-mile and one mile from the school and for students living between one and two miles from school. The only shared modes were reported by caregivers living between a mile and two miles from the school.

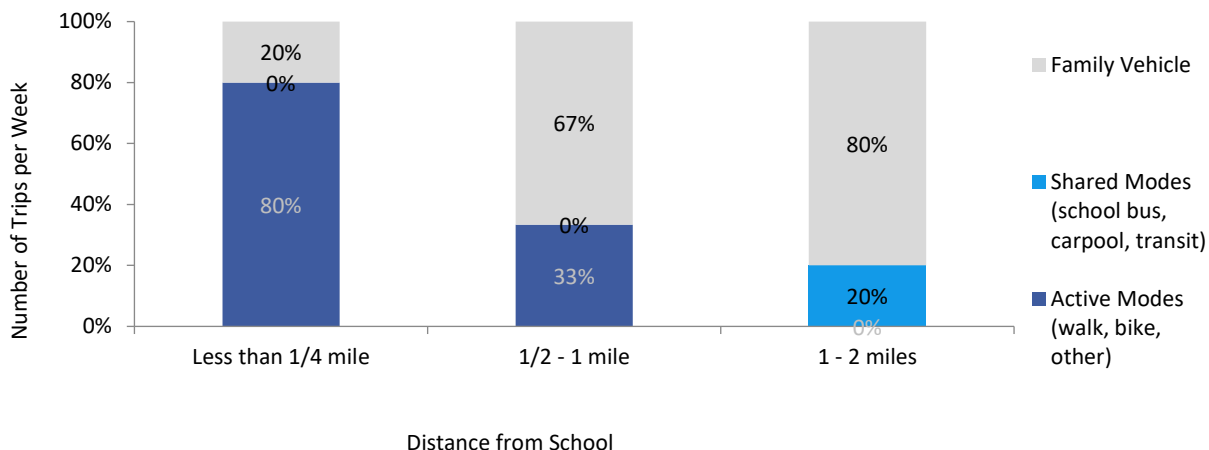Figure 4. Mode Split by Distance from School, 2022 Caregiver Survey

Table 2. Count of Trips by Distance the Family Lives from School, 2022 Caregiver Survey

DISTANCE	WALK	BIKE	SCHOOL BUS	FAMILY VEHICLE	CARPOOL	TRANSIT	OTHER
Less than 1/4 mile	28	0	0	42	0	0	0
1/4 mile up to 1/2 mile	20	0	0	10	0	0	0
1/2 mile up to 1 mile	0	0	0	20	0	0	0
1 mile up to 2 miles	0	0	11	9	0	0	0
More than 2 miles	0	0	0	0	0	0	0

As Figure 5 illustrates, none of the caregivers surveyed reported that they would allow their student to walk to school by themselves. Three would allow walking if the student were accompanied by another child or sibling, while three more would allow them to walk with a trusted adult, and two caregivers would not allow their student to walk at all. Five caregivers surveyed reported that they would allow their student to bike (two with a friend or sibling and three with a trusted adult). Three caregivers indicated they would not allow their student to bike at all to school.

Figure 5. Do You Allow This Student to Travel to School in the Following Ways?, 2022 Caregiver Survey
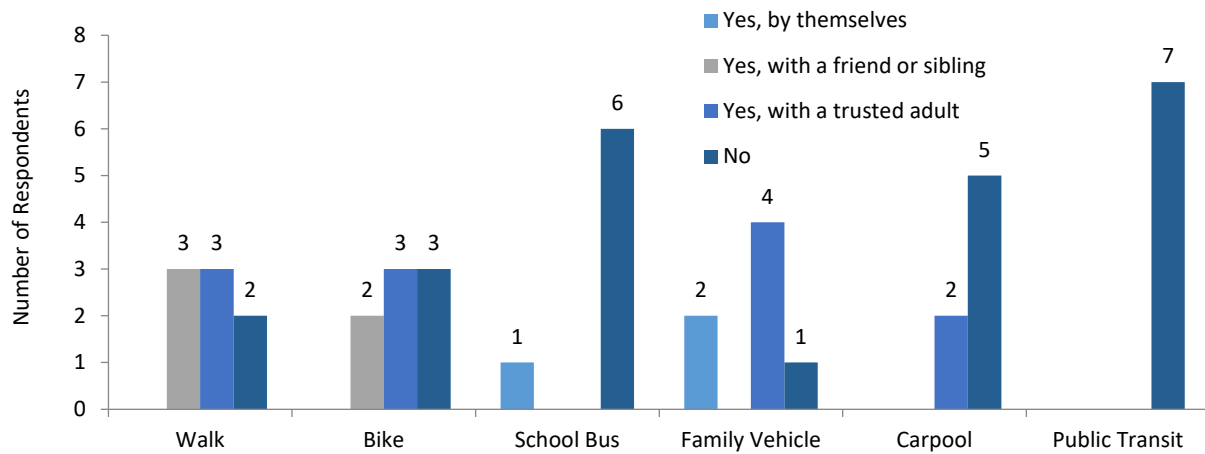
While caregivers reported varying concerns that limit their student's ability to walk or bike to school, some were more commonly expressed than others (see Figure 6). The following were top concerns for respondents within the Jefferson Elementary School community:

- Poor driver behavior
- Convenience of driving
- Concerns about personal safety, documentation or criminal activity
- Time it takes to walk or bike

Figure 6. What Concerns Limit Your Student's Ability to Walk or Bike to/from School?, 2022 Caregiver Survey
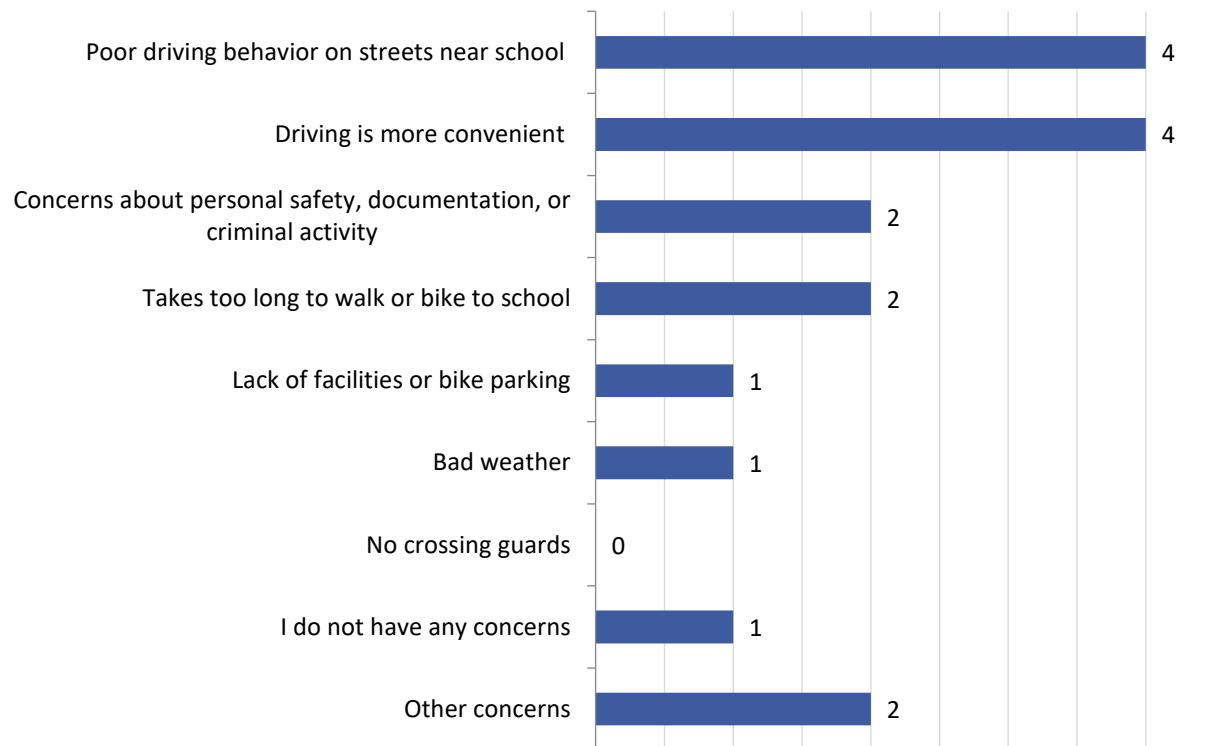

A majority of caregiver respondents (seven out of eight) felt Jefferson Elementary School encouraged students to walk and bike to school at the time of the survey. Meanwhile, one felt that Jefferson Elementary neither encouraged or discouraged active modes (see Figure 7).

Figure 7. Agree/Disagree: Walking/Biking to/from School Is Encouraged by My Student's School, 2020 Caregiver Survey
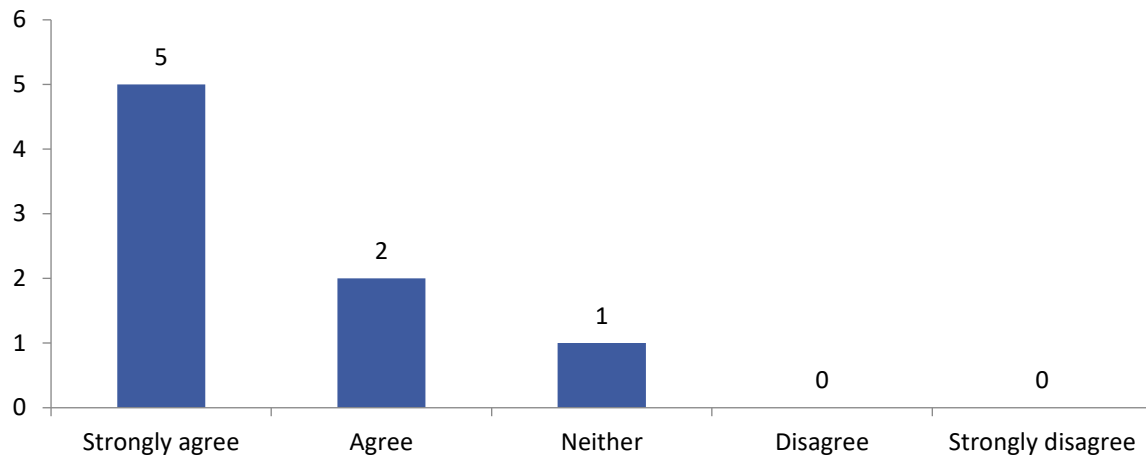
At the time of the survey, all eight caregivers reported that they agreed walking or biking to school would be a fun activity for their students (Figure 8).

Figure 8. Agree/Disagree: Walking/Biking to/from School Is Fun for My Student, 2022 Caregiver Survey
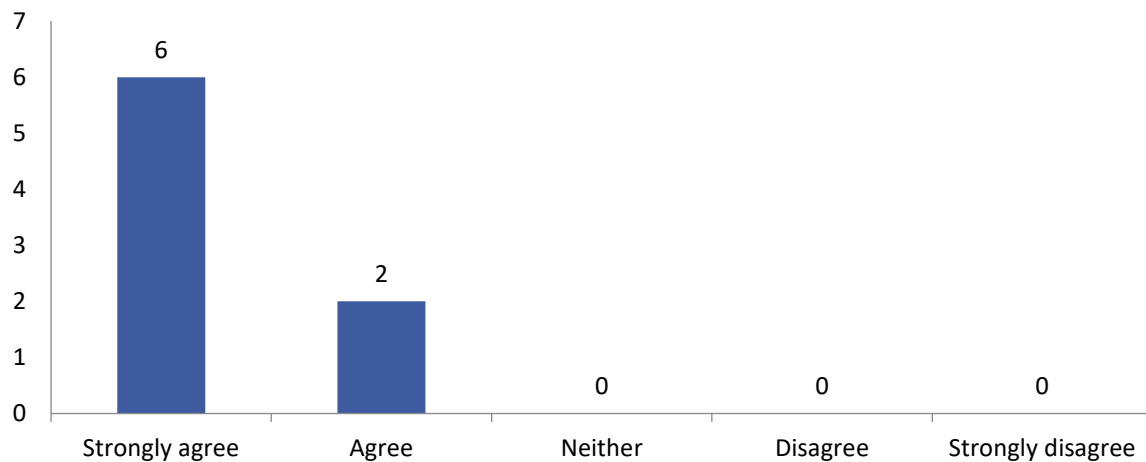
All of the caregivers who responded to this survey agreed about the health benefits of active transportation, seven out of eight strongly agreeing that it was healthy and one agreeing (see Figure 9).

Figure 9. Agree/Disagree: Walking/Biking to/from School Is Healthy for My Student, 2022 Caregiver Survey
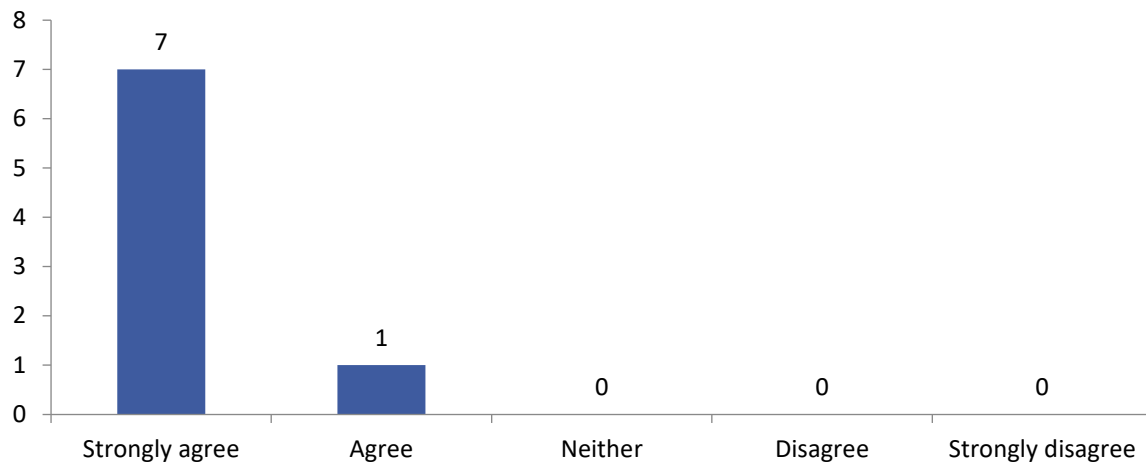
A majority of caregiver respondents (seven out of eight) expressed that they wished their family walked or biked to school more often. None disagreed with the statement, indicating that they weren't interested in walking or biking, while another three were neutral on the matter (see Figure 10).

Figure 10. Agree/Disagree: Walking/Biking to School Is Something I Wish We Did More Often, 2022 Caregiver Survey
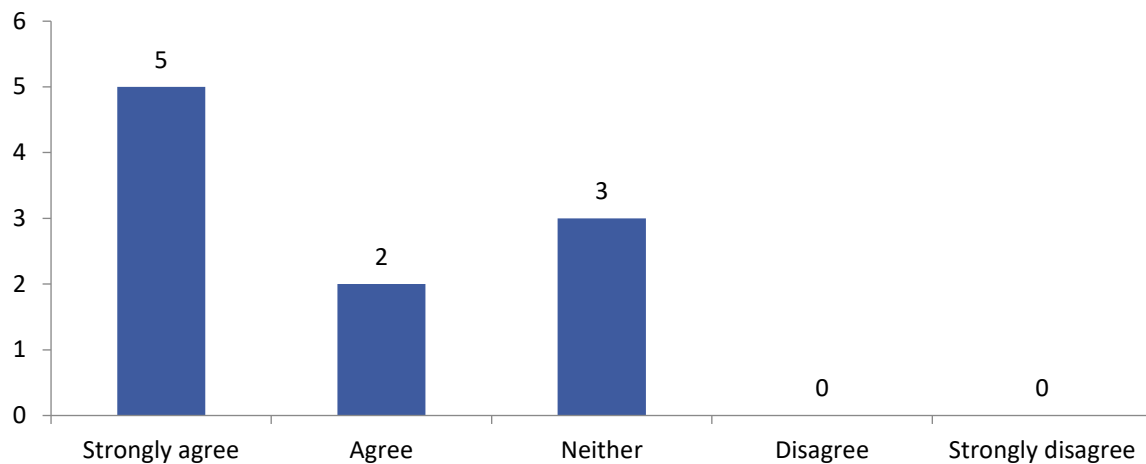
Crash Data – Jefferson Elementary School

|	
DATE COLLECTED:	**2014-2018**
DATA COLLECTION PROCESS:	Crash data included in this report originates from relevant roadway jurisdictions, as well as the ODOT SRTS Web Map Application for the years 2014-2018. This analysis does not determine whether the grant intervention *caused* any change in the occurrence of crashes, due to small sample size. Additionally, due to insufficient mode split data to calculate crash *rates*, this report offers a count and description of reported incidents.
NUMBER OF REPORTED CRASHES INVOLVING BIKES AND PEDESTRIANS WITHIN 1 MILE OF SCHOOL:	Between 2014 and 2018, 50 crashes involving a bicyclist or pedestrian were reported within a mile of the school.
TIME OF REPORTED CRASHES INVOLVING BIKES AND PEDESTRIANS WITHIN 1 MILE OF SCHOOL*:	Forty-three of these reported crashes occurred during school commuting hours; the rest occurred outside these hours. *For these purposes school commuting hours were defined as 6 AM to 9 PM*.
NUMBER OF REPORTED INJURIES BY SEVERITY WITHIN 1 MILE OF THE SCHOOL:	All of the 50 reported crashes involved injury to a bicyclist or pedestrian. Of the 28 bike crashes reported, all were non-fatal. Of the 22 pedestrian crashes reported, 20 were non-fatal and two were fatal. Figure 11 illustrates the location of the crashes by type and injury severity. *(Note that some crashes may be shown on the map that are not included in this total; they occurred outside a 1-mile radius from the school. Additionally, some crash icons may be beneath others if they occurred at the same location).*
ADDITIONAL CRASH DATA CONSIDERATIONS:	N/A

Figure 11: Jefferson Elementary School Bicycle & Pedestrian Collisions (2014-2018)
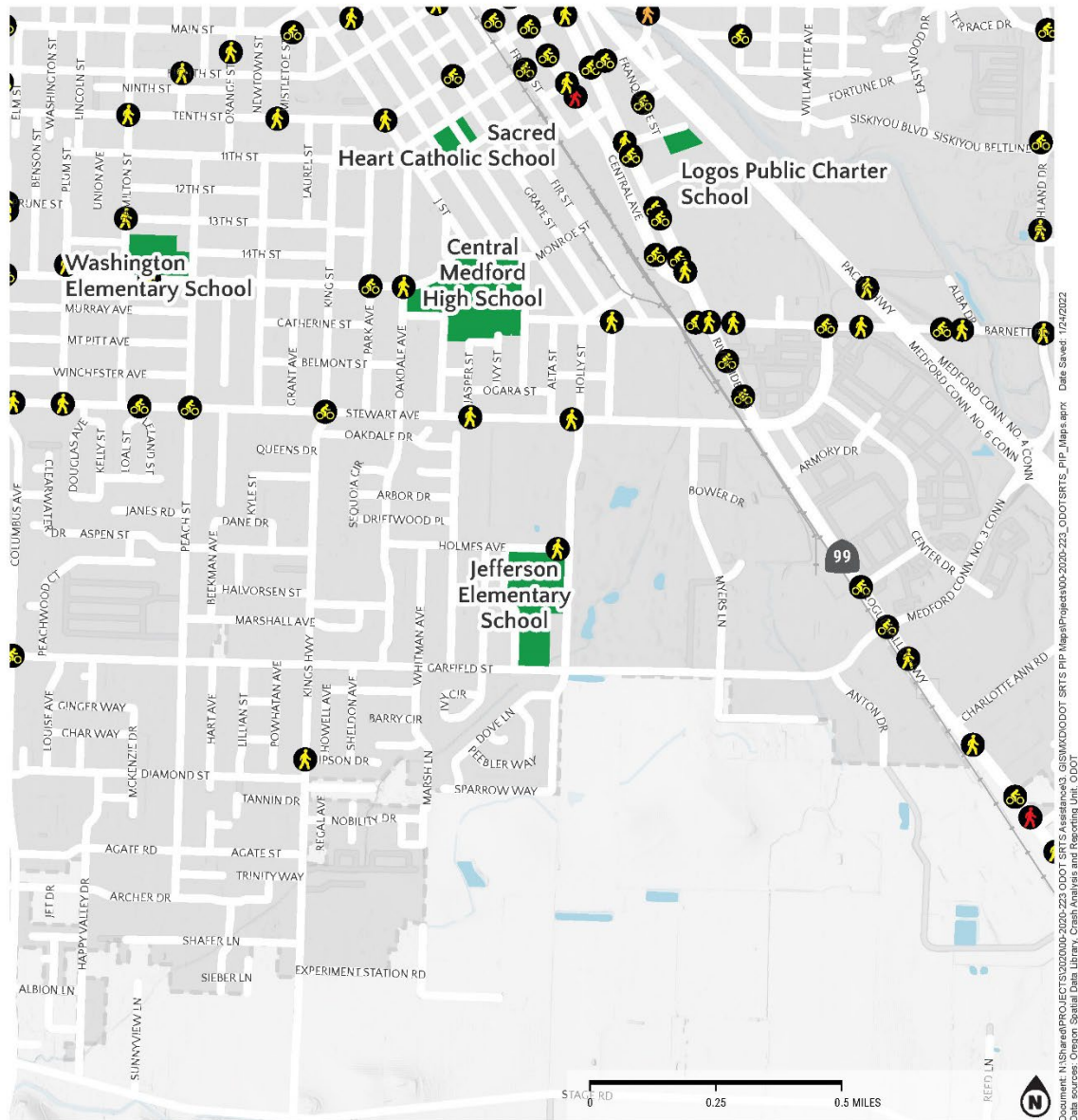
COLLISIONS WITH PEOPLE WALKING AND BIKING 2014-18

Pedestrian Collisions
- Pedestrian Injury
- 2 or more Pedestrian Injuries
- Pedestrian Fatality

Bicyclist Collisions
- Bicyclist Injury
- 2 or more Bicyclist Injuries
- Bicyclist Fatality

- Railroad
- School Property
- Parks
- Water
- City Boundary

Follow-Up Data Collection Plan

Timeline

Post-grant field visits to collect follow-up data will be scheduled to take place the spring following the completion of each grant intervention. The City of Medford estimates project completion is planned for November 2022.

Follow-Up Data Collection Process

METHOD	PLANNED AT THIS SITE?	TARGET SAMPLE SIZE	TARGET FIELD WORK DATE
STUDENT HAND TALLIES:	Yes	At least 2 classrooms per grade per school OR administrator survey	Spring 2023 (assuming project completion)
CAREGIVER SURVEYS:	Yes	At least 30 caregivers per school	Spring 2023 (assuming project completion)
CAREGIVER FOCUS GROUPS:	Yes	4-10 caregivers	Spring 2023 (assuming project completion)
STAFF SURVEYS:	Yes	1-3 school staff and administration	Spring 2023 (assuming project completion)
COMMUNITY SURVEY	YES	At least 20 community members	Spring 2023 (assuming project completion)
CRASH DATA:	Potentially	N/A	Five year comparative data (2023-2027 will likely be available in 2030)
OTHER (LIST):	None	N/A	N/A

Appendix A. Final Report DRAFT Outline

Note: The following Final Report outline is subject to change.

Chapter 1. Introduction

- Description of SRTS Construction Grant Program
- Description of Final Report purpose and contents

SUMMARY OF FUNDED INFRASTRUCTURE IMPROVEMENTS

- Project description
- Map of improvements
- Project timeline

BACKGROUND

- School demographics
- Summary of Non-Infrastructure SRTS Work
- Place Type

Chapter 2. Data Collection and Results

HAND TALLY DATA

- Data Collection Methods
- Change in walking and biking rates

CAREGIVER SURVEY DATA

- Data Collection Methods
- Change in mode split by distance from school
- Change in barriers to walking and biking
- Change in perceptions of walking and biking
- Other observations

FOCUS GROUPS

- Data Collection Methods
- Change in barriers to walking and biking
- Change in perceptions of walking and biking

CRASH DATA

- Data included in analysis
- Change in crash data (*If available, otherwise this will provide updated baseline crash data from ODOT*)

Chapter 3. Findings

- Impact of Infrastructure improvements on mode split
- Impact of Infrastructure Improvements on Access to Safe Infrastructure

- impact of improvements on safety/perception of safety
- Impact of infrastructure improvements on Program lifespan/partnerships
- Impact of infrastructure improvements on equity
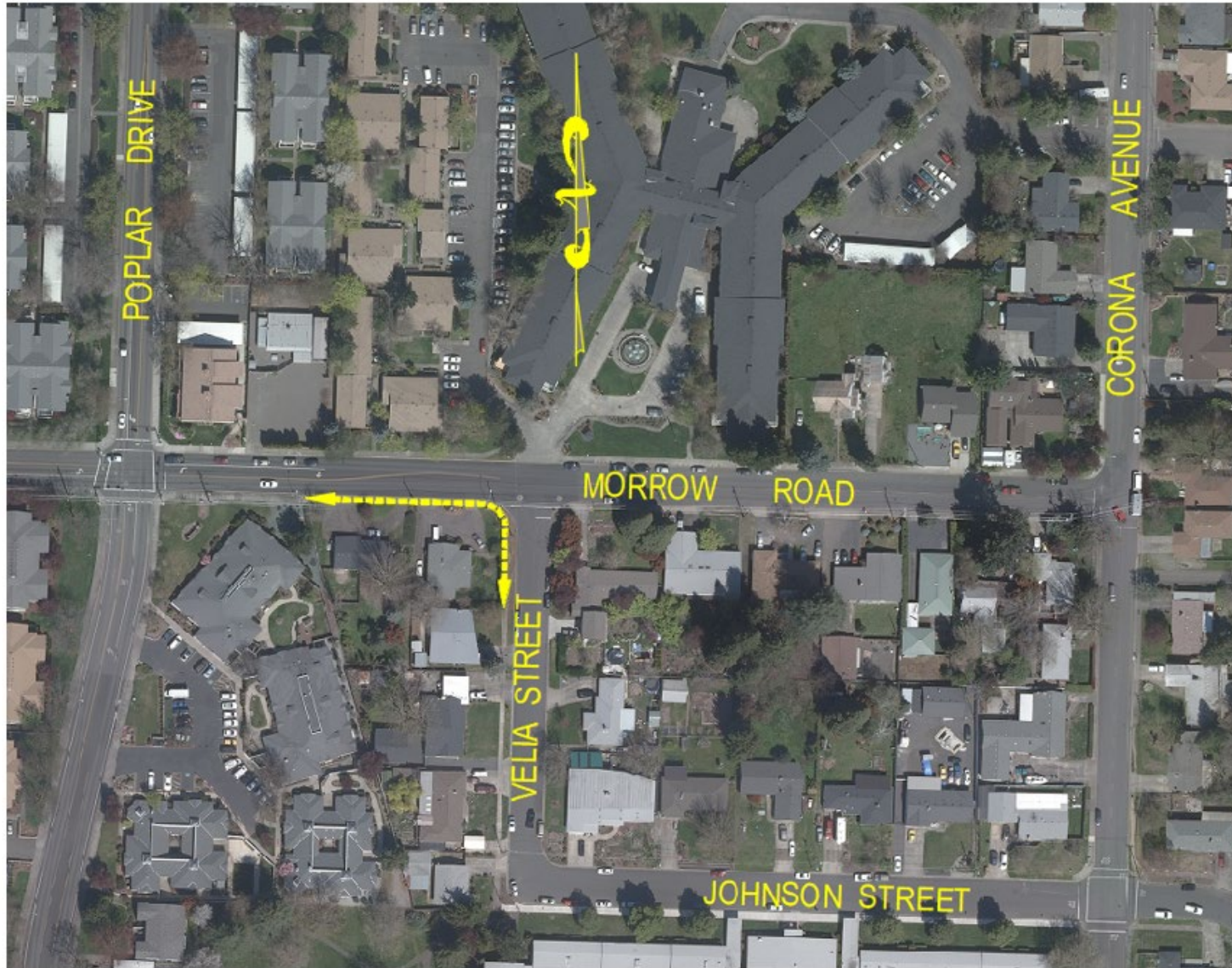- Other Findings
- Next Steps and Recommendations

Appendix B. Competitive SRTS Infrastructure Grant-Funded Project Area Map

Figure 12. City of Medford Competitive SRTS Infrastructure Grant-Funded Project Area Maps

a)   Project 1: Columbus & Prune

b) Project 2: Morrow / Velia Sidewalk Infill

c) Project 3: W 13th / W 14th Sidewalk Infill

Appendix C. Access to SRTS Detailed Methodology

Purpose

The access map analysis was designed to estimate the number of students with new or significantly improved access to school upon the implementation of a proposed walking or biking facility. While determining the number of students who benefit from a proposed project is not an exact science, this analysis provides a common approach that utilizes school district boundaries, census population data and local zoning codes to generate rough estimates. These estimates lend greater insight into the impact of a particular Safe Routes to School project, allowing facility improvements to be compared and thus aid in prioritizing investments. This memo outlines the data sources, methods, and assumptions that inform the access map analysis described in this report.

Data Sources

Three primary data sources were used in this analysis in conjunction with the information provided in each project application:

Name	Source
American Community Survey (ACS) Population Estimates	US Census Bureau
Oregon School District Boundaries	Oregon Department of Education
2017 Oregon Statewide Zoning Map	Oregon Department of Land Conservation and Development

Methods

The analysis establishes two geographical areas in which census block population data are apportioned to: 1) the school area and 2) the access area. The school area is defined as the area that is within a 1-mile radius of the applicant school or within the enrollment boundary, whichever is closer. This area covers residents within reasonable walking or biking distance of the school. The access area is the area that covers all residents who would experience new or significantly improved access to school upon the implementation of the proposed walking or biking facility.

Once both of these areas were established, the consultant team identified the census blocks that intersect each. We then apportioned the population data from the census blocks to the school area and the access area, based on the relative coverage of each census block. To account for varying residential densities in each census block, we used residential zoning data to determine the proportion of the population that should be attributed to the school area and access area.

After the estimated populations of both the school area and the access area are calculated, the local jurisdiction's youth rate is applied to each to get the number of people ages 5-17 in those areas, which we refer to as the "school age population." Finally, the school age populations of the access area and the school area are compared. The percentage of school age students with new or improved access to school represents the proportion of students impacted by the project out of all the students in the school area who could reasonably walk or bike to school.

Defining the Access Area

The boundary of the school area is readily calculable using GIS and the rules described above. By contrast, the access area boundary was determined manually based on the project description and professional judgement of impact. While this method inherently includes subjective judgement, the high variability and nuance in the transportation context surrounding the proposed project makes this method more suitable for determining the residential areas apportioned that would benefit from its implementation than a purely GIS-based workflow. The following assumptions and rules of thumb were adopted in order to make the assessment of the access areas as uniform as possible:

1. The analysis assumes people are willing to "walk around the block" half the distance of their street in the opposite direction of school in order to utilize a safe path to school.
2. The analysis assumes that Google Earth street view imagery is up to date, as this was used to determine sidewalk connectivity and condition, which informed the access areas.
3. Places without sidewalks, particularly in small towns, are considered walkable if the street is narrow, residential, and designed for a low volume of traffic (i.e., lacks a centerline)
4. The access areas consider ADA accessibility and account for those in wheelchairs or other mobility devices.
5. The access areas may include residents who have to walk more than one mile to school, based on the available street network.
6. Even if some residents may have already had access to school, they might be included in the access area if the proposed project would significantly improve their access to school.

Apportioning Census Population Data

As described above, census population data was apportioned to both the school area and the access area based on how much a census block covered them. However, to account for varying population densities across census blocks, residential zones in the census blocks were identified.

The statewide zoning data provided by the Oregon Department of Land Conservation and Development groups residential zones across all jurisdictions in the state into 13 categories of increasing density. Our team further consolidated these categories into just 4: Low Density, Medium-Low Density, Medium-High Density, and High Density. We then weighted these categories by their relative density compared to Low Density:

Residential Zone Group	Population Density Factor
Low Density	1

Residential Zone Group	Population Density Factor
Medium-Low Density	2
Medium-High Density	5
High Density	15

These factors serve to more accurately distribute the population data across the residential zones within the census block. In other words, if the census block contained only Low-Density residential zones, then the population of any given area within that census block is equal to the proportion of the census block that that area covers. By contrast, if a census block contains Low Density residential zones and High-Density zones, we attribute 15 times the population of the census block to the High-Density zones than the Low-Density zones. The density factors were determined using the typical number of dwellings per acre in each zone.

The analysis uses these four zoning categories to identify the spatial distribution of the population of the census block and apportion it to the overlaying school area and access areas based on how much those areas cover the residential zones of the census block.

General Assumptions

- This analysis assumes that the Oregon Statewide Zoning code reflects the actual residential densities of the current built environment.
- Areas that were zoned for housing that had no development on them according to the latest satellite imagery (and therefore significantly impacted the output) were removed from the analysis in order to improve the accuracy of the estimates. This was only utilized in a few low-population jurisdictions.
- For rural schools with no local residential zoning reported, the population of the appropriate block group is assumed to be evenly distributed across the school zone and the percentage of people served is equal to the percentage of the school zone covered by the new access area.
- This analysis assumes that families are evenly distributed between each of the four residential zone groups.
- The reported number of school-age students includes all students ages 5-17, not just elementary or middle school students. Thus, the number of students who actually attend the applicant school is likely much lower than the reported figure.