TOWN OF SUPERIOR

PAVEMENT ASSESSMENT STUDY

FINAL REPORT
JANUARY 2017

This report was funded in part through grants from the Federal Highway Administration, U.S. Department of Transportation. The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data, and for the use or adaptation of previously published material, presented herein. The contents do not necessarily reflect the official views or policies of the Arizona Department of Transportation or the Federal Highway Administration, U.S. Department of Transportation. This report does not constitute a standard, specification, or regulation. Trade or manufacturers' names that may appear herein are cited only because they are considered essential to the objectives of the report. The U.S. government and the State of Arizona do not endorse products or manufacturers.

The Town of Superior's Council approved and adopted the study on January 12th, 2017.

TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

1. STUDY OVERVIEW

The *Superior Pavement Assessment Study* is a joint effort by the Town of Superior (Town) and the Arizona Department of Transportation (ADOT) to evaluate the Town's existing pavement conditions in an effort to develop a pavement management plan that prioritizes projects and maximizes limited funding. Pavement management is the systematic process of planning the upgrade and maintenance of pavements in a cost-effective manner that maximizes return on investments and enhances the life of the roadway. Due to a significant decline in the Town's population and a decrease in revenue, roadway maintenance funds have substantially reduced, requiring the Town to assess and prioritize roadway maintenance needs.

COMMUNITY OVERVIEW

Situated in the northeast portion of Pinal County, the Town is located at the crossroads of the major regional corridors of US Highway 60 (US 60) and State Route 177 (SR 177). In 1910, Boyce Thompson founded the Magma Copper Company, leading to the development of the Town. Once a thriving mining town with a bustling Main Street, production cutbacks at the Magma Copper Company led to significant population decline and reduced economic growth. Today, the Town is primarily a commuter town (with residents traveling to adjacent local communities for work) that is trying to transform into a tourist destination for travelers visiting the Boyce Thompson Arboretum, Apache Trail, surrounding recreational areas along US 60, and historic sites within Superior.

Land Use and Development

Surrounded by the Tonto National Forest and the Resolution Copper Mine, the Town is densely developed along Queen Creek Wash. In total, the Town is 17.8 square miles and had an estimated population of 2,929 in 2015. Approximately one-third of the Town land area is privately held (BHP Billiton being the largest holder of private lands), with the Tonto National Forest owning the remainder of the land. Commercial businesses are primarily located off US 60, Main Street, and Magma Avenue. Elementary and junior/senior high schools are located along Panther Drive (formerly Mary Drive).

Roadway Network

The Town is connected by a series of local roadways and a small network of sidewalks. In total, the Town is comprised of 25.6 miles of local roadways, both paved and unpaved. Figure 1.1 illustrates the study area and study roadway network for this project.

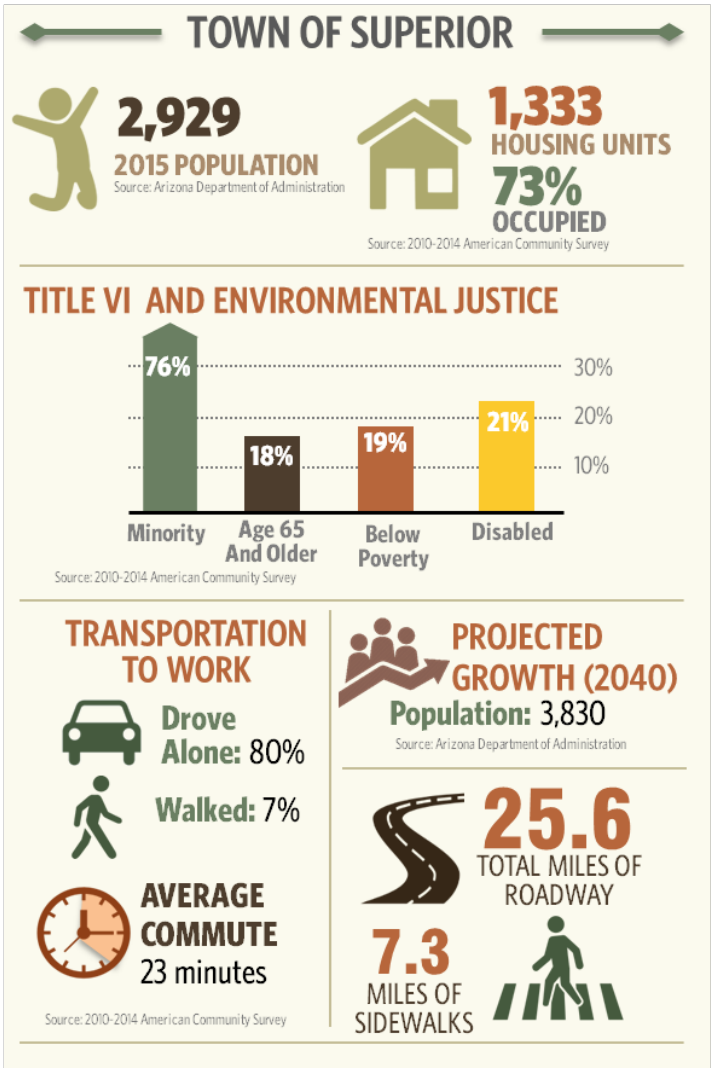


Figure 1.1: Study Area

PURPOSE AND NEED

With the ultimate purpose of enhancing safety and maximizing the value and life of the pavement network, the *Superior Pavement Assessment Study* was initiated to evaluate the condition of the Town's infrastructure to develop short- and long-term strategies for the maintenance and repair of the Town's system of roadways, sidewalks, and pathways. Due to substantial reductions in maintenance funds, the need for this study stemmed directly from the Town's desire to develop a systematic approach for infrastructure maintenance and rehabilitation that leverages funding to best address the needs of the local transportation network. The project purpose is demonstrated with the following statement of need:

- **Inventory of Roadway, Sidewalk, Trail, and Path Pavement Conditions.** The last full-scale pavement evaluation for the Town was conducted for the *2008 Superior Small Area Transportation Study*. Since this study, multiple roadways have been rehabilitated and others have deteriorated for various reasons (i.e., drainage, weathering, usage of heavy-trucks, etc.). Additionally, the Town does not have an up-to-date evaluation of sidewalk, trail, and path conditions.
- **Standardized Pavement Evaluation and Rating.** In order to systematically evaluate each roadway section's health, a standardized pavement condition rating system and evaluation methodology needs to be established.
- **Develop Prioritized List of Maintenance and Construction Needs.** This report will serve as guidance for the planning and prioritization of infrastructure improvements in order for the Town to allocate and obtain funding. The maintenance and construction plan includes: routine and preventative maintenance needs, spot treatments, major and minor rehabilitation, reconstruction, construction of system gaps, and maintenance strategies to provide the best benefit for the dollar.

TECHNICAL ADVISORY COMMITTEE

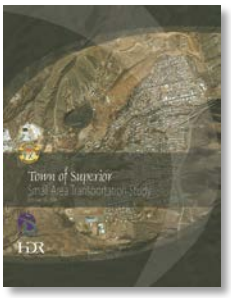
This study was guided by a Technical Advisory Committee (TAC). The role of the TAC was to provide technical guidance, support, advice, suggestions, recommendations, and to perform document reviews throughout the study process. TAC members included representatives from:

- Town of Superior
- Central Arizona Governments (CAG)
- Arizona Department of Transportation, Multimodal Planning Division (ADOT MPD)
- Arizona Department of Transportation, Southeast District
- Pinal County Public Works Department, Transportation Planning
- Pinal County Flood Control District
- Willdan Engineering (Town's Engineer)

2. REVIEW OF RELEVANT STUDIES AND POLICIES

This chapter presents a review of studies, plans, and policies relevant to this study. Review of completed and current planning efforts often provides an insight into previously identified transportation issues and potential transportation improvements. This chapter also summarizes approved future transportation improvements within the study area.

ON-GOING AND COMPLETED STUDIES



2008 Town of Superior Small Area Transportation Study (SATS)

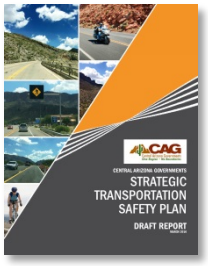
The Superior SATS was developed to document existing and future land use and socioeconomic conditions, roadway characteristics and operations, and to identify deficiencies and needs. The document serves as a planning tool for the ongoing planning, maintenance, and construction of multimodal improvements within the Town. The study also included an inspection of four roadway segments. The study recommended the following improvements:

Project Location	Recommended Improvement
Panther Drive* (US 60 to Golf Course Road) ** Panther Drive was formerly called Mary Drive*	Mill and overlay and street lighting
O'Donnell Drive (Golf Course Road to Smith Drive)	Mill and overlay
Smith Drive (O'Donnell Drive to Sunset Drive)	Mill and overlay
Main Street (US 60 to Lobb Avenue)	Repair/level utility trench patching and street lighting
Stone Avenue	Realign Heiner Drive intersection
Golf Course Road (wash crossing)	Install new crossing structure
Stone Avenue (Queen Creek crossing)	Install new crossing structure
Panther Drive (Queen Creek crossing)	Install new crossing structure

1994 Superior Small Area Transportation Study

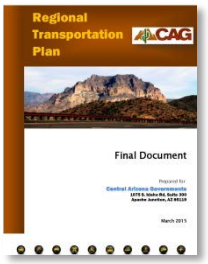
The 1994 Superior SATS included the last full-scale pavement assessment of conditions within the Town. The assessment included conducting a visual condition survey of the roadway network, calculating the Pavement Condition Index (PCI) for each roadway segment, and prioritizing pavement improvements. The study also included recommendations for developing a Pavement Management System (PMS). Figure 2.1 illustrates the pavement rehabilitation plan, which ranged from total to partial reconstruction to routine maintenance.

Figure 2.1: 1994 Pavement Rehabilitation Map



2015 CAG Strategic Transportation Safety Plan (STSP)

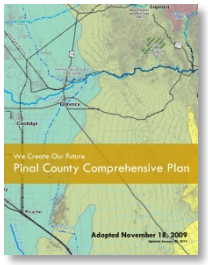
The 2015 CAG STSP was developed to identify critical safety trends and issues and outline policies, programs, and projects for a safe transportation network in the CAG region. The Plan included a network screening of intersections and roadway segments to identify and rank sites that are most likely to reduce crash frequency or severity following implementation of a countermeasure. Within Superior, US 60 was ranked as a medium-high priority site, SR 177 as a medium priority, and local roadways were determined to be a low priority.



2015 CAG Regional Transportation Plan (RTP)

The RTP provided a framework for allocating funding for transportation improvements throughout the CAG Region through a planning horizon of 2040. Key elements included:

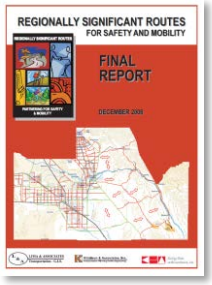
- A key goal of the RTP is to support community development and sustainability in the Copper Corridor Economic Development area and the North Eastern Pinal Economic Partnership area.
- Town's population is projected to increase from 2,906 in 2010 to 4,789 by 2040. Employment is projected to increase from 602 in 2010 to 2,447 by 2040.
- A proposed Off-Highway Vehicle (OHV) Trail was identified along Telegraph Canyon Road



2008 Pinal County Comprehensive Plan

The purpose of the *Pinal County Comprehensive Plan* was to prepare a course of action for the County to manage growth, preserve the quality of life, and ensure sustainability while promoting economic vitality and ensuring environmental stewardship. Key elements of the plan include:

- US 60 and SR 177 are identified as Hospitality and Tourism corridors. The study recommended working with ADOT to identify areas for scenic viewpoints, promote bicycling along the corridors, and to support the Copper Corridor strategies for contextual economic development.
- Superior is projected to grow by about 500 dwelling units, 5,000 jobs, and increase in population by 1,150.



2008 Regionally Significant Routes for Safety and Mobility

The 2008 *Regionally Significant Routes for Safety and Mobility* study created a plan to be used as a guide for Pinal County and other stakeholders to implement and fund Regionally Significant Routes. Key study elements include:

- The study identified US 60 and SR 177 within Superior town limits as regionally significant routes and medium priority corridors.
- Right-of-Way (ROW) preservation, and access management is recommended for US 60 and SR 177 within Superior.

CURRENT POLICIES AND CODES

The following presents an overview of current policies, practices, and codes enforced by the Town.

Roadway Maintenance

The Town currently does not have a formal roadway maintenance plan in place.

Sidewalk Maintenance and Construction

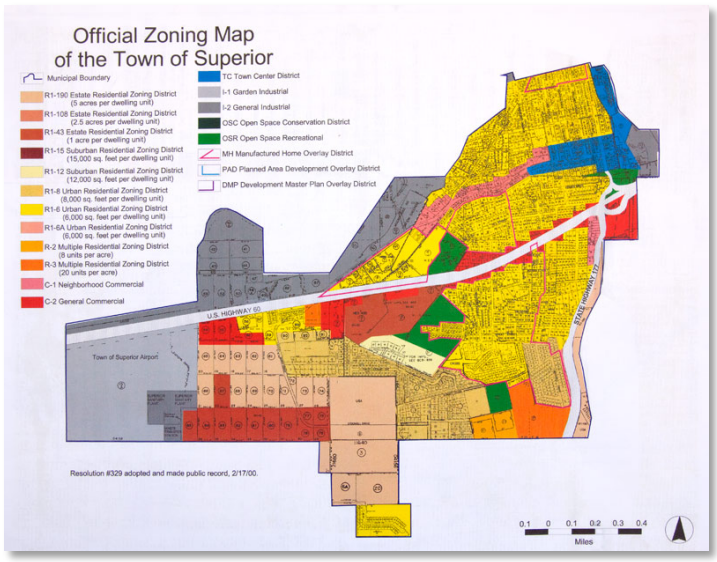
According to Article 9-9 of the Town Code, it is the duty of the owner of any parcel abutting a sidewalk to keep and maintain the sidewalk in good condition. Whenever any sidewalk in the Town becomes defective, the Public Works Director shall notify the owner of the abutting property to immediately repair sidewalk. Unless immediate steps are taken by the owner to repair the sidewalk, the Town shall proceed to repair the sidewalk and tax the cost of repairs to the abutting property owner.

The Council, whenever it is in the best interests of the public, may pass a resolution for the construction of new sidewalks. The resolution shall set forth the location and width of the sidewalk to be constructed. Upon failure of such owner to comply with such resolution and the notice provided, the Town shall have the right to construct such sidewalks and assess the costs thereof to the abutting property owner.

Zoning Ordinance

The purpose of the Zoning Ordinance is to provide the minimum requirements for the implementation of the General Plan; promote the public interest, health, comfort, safety, convenience, and general welfare; to protect the character and the stability of residential, business, recreational, and industrial areas of the community; and to guide, control and regulate the future growth and development. Figure 2.2 illustrates the approved zoning within the Town. As illustrated in the Figure:

Figure 2.2: Official Zoning Map of the Town of Superior



- The western portion and north of US 60 (west of Main Street) is zoned as Industrial.
- Commercial zoning is primarily along US 60, Main Street, west of Pinal Avenue, and along SR 177.
- The Town Center District is located along Main Street and Magma Avenue. The intent of the Town Center Zone District is to maintain and enhance the character of the historic buildings within the downtown area while promoting a pedestrian-oriented specialty retail district.
- Estate Residential Districts (1- 5 acres per dwelling unit) are located south of US 60 in the western portion of the Town.
- There are four plats of land zoned for Open Space Recreational usage. The purpose of the Open Space Zone Districts are to conserve and protect open space, washes, natural desert lands, wildlife habitat, and lands agreed to be left undeveloped through the plan approval process.

Comprehensive listings of zoning ordinances are available on the Town's website at:
http://www.superioraz.gov/index.php/design-and-features/planning-and-zoning

PROGRAMMED AND SCOPED PROJECTS

ADOT's Multimodal Planning Division publishes the Arizona State Transportation Improvement Program (STIP), which identifies priority transportation projects that utilize federal funds over a five-year timeframe. The ADOT MPD Planning and Programming section compiles the STIP from a list of projects from regional transportation improvement programs (TIPs). No projects pertinent to the Town were listed in the *2016-2020 Five-Year Construction Improvement Program*. Table 2.1 lists the roadway improvement projects in the Town as identified in the *CAG Transportation Improvement Program (TIP)*.

Table 2.1: CAG Regional Transportation Improvement Program FY 2016 – 2026

Year	Project #	Project Name and Location	Project Type	Federal Aid	Total Costs
2016	SUP-16-01D	Sign and Pavement Markings Inventory	Design	HSIP	$70,000
2017	SUP-17-01C	Sign and Pavement Markings Inventory	Construction	HSIP	$200,000

Source: Central Arizona Governments (Approved June 24, 2016)

US 60: SILVER KING/SUPERIOR WIDENING PROJECT

For over 40 years, ADOT has been working to improve US 60 between Interstate 10 and Superior. The US 60: Silver King / Superior widening project is a $32.8 million dollar project to extend the divided highway through Superior to SR 177. The project includes widening US 60 to four-lanes, installing an 18-foot median, constructing median crossings at six intersections, and widening the overpass at Stone Avenue. As illustrated in Figure 2.3, upon completion of the project there will be median crossings available at Airport Road, Mesquite Road, Panther Drive, Main Street, Western Avenue, and Church Avenue. In addition, Stone Avenue will cross US 60 at an underpass. All other intersections and driveways will be converted to a right-in/right-out only with left turn pockets at appropriate locations.

Figure 2.3: Proposed US 60 Crossing Locations

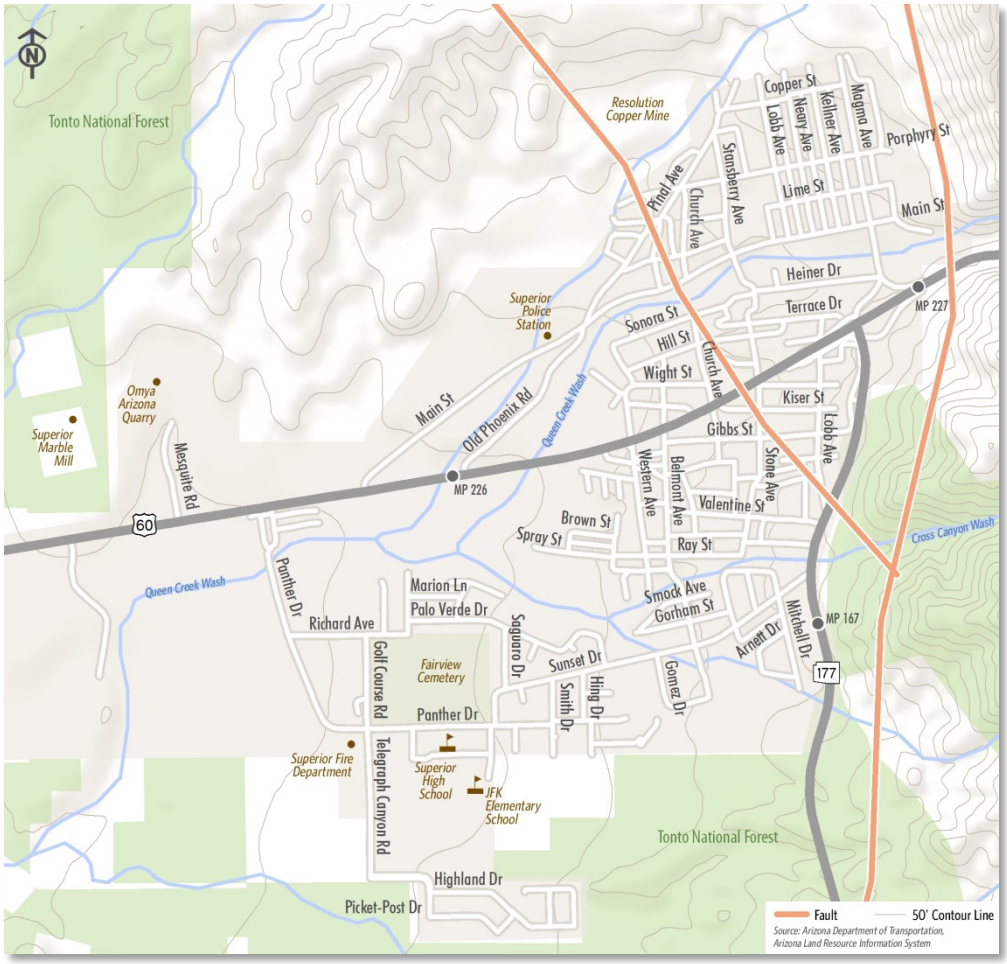
3. EXISTING CONDITIONS

The following section summarizes existing physical and transportation system conditions.

TOPOGRAPHICAL ENVIRONMENT

The Town is located along the rugged terrain between the western boundary of the Pinal Mountain range and the eastern boundary of the desert valleys of Central Arizona. Located at the gateway to the Tonto National Forest, the Superior area is surrounded by rugged mountain peaks and canyons, including Pickpost Mountain, Apache Leap, Kings Crown Peak, Peachville Mountain, and Queen Creek Canyon. Within the Superior Area, elevations range from 2,400 FT in the bed of Queen Creek Canyon near the Boyce Thompson Arboretum, to 5,630 FT at the crest near Kings Crown Peak. Although outside of the town limits the elevation variations are extensive, within Superior, the elevation ranges from 2,550 FT at the western boundary to 2,850 FT at the eastern boundary.

Figure 3.1: Superior Area Topography



Superior's roadway network was developed around the area's rugged terrain and steep slopes. While the majority of roadways transverse rolling terrain or have slight slopes, the following segments have sharp inclines: Lobb Avenue (north of SR177), Stone Avenue (US60 underpass), Church Avenue (between Hill Street and Heiner Drive), and Stone Avenue (between Hill Street and Heiner Drive).

Two faults are also located within Town. Faults are fractures or zones of fractures between two blocks of rock that allow the blocks to move relative to one another, as defined by the United States Geological Society (USGS). The two fault lines within the study area are generally located on the eastern half of Superior. Major study roadways such as Pinal Avenue, Main Street, Sonora Street, Church Avenue, Stone Avenue, and Lobb Avenue are located on the fault line. Earth fissures and faults are related to earth displacement and seismic activity, which can negatively impact infrastructure. According to the Arizona Geological Survey (AZGS) there are no known fissures within the town limits.

Figure 3.1 provides an overview of the Superior area's topography.

CLIMATE OVERVIEW

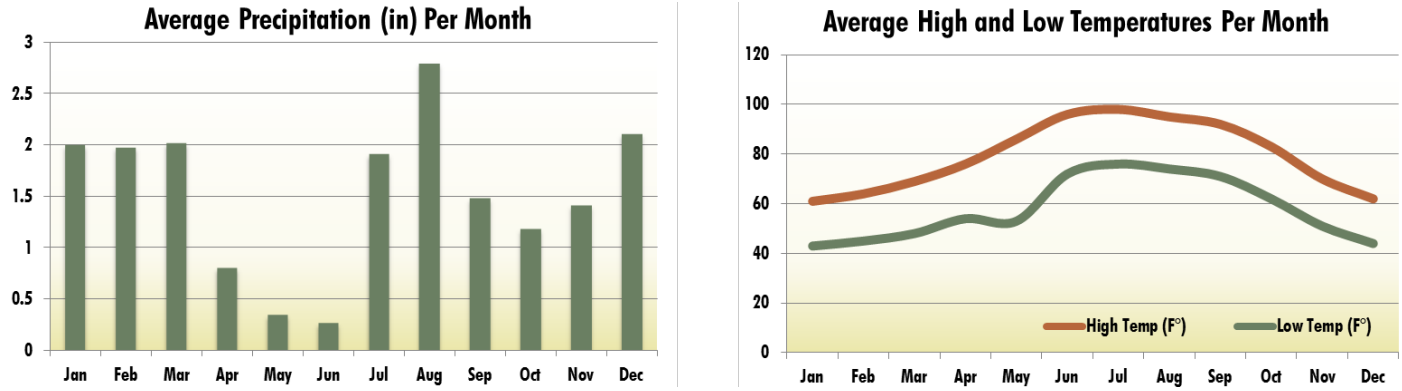
According to the Köppen climate classification, Superior has a hot semi-arid climate. Table 3.1 and Figure 3.2 summarize the Town's average temperature and precipitation by month. As illustrated, the Town experiences very hot summers and mild winters. On average, the Town receives 18.30 inches of precipitation and 1.4 inches of snowfall a year. April through June are the driest months, while August is the wettest month with 2.8 inches on average.

Table 3.1: Average Temperatures and Precipitation

Title	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
High Temp (F°)	61	64	69	76	86	96	98	95	92	83	70	62	79
Low Temp (F°)	43	45	48	54	53	72	76	74	71	62	51	44	59
Precipitation (in)	2.00	1.98	2.02	0.8	0.34	0.26	1.91	2.80	1.48	1.18	1.41	2.11	18.30
Snowfall (in)	0.3	0.5	0.3	0.1	0	0	0	0	0	0	0	0.2	1.4
Rainy Days	5	5	5	3	2	1	7	8	4	3	4	5	52

Source: Western Regional Climate Center (Data Range 1981-2010)

Figure 3.2: Average Temperatures and Precipitation



Source: Western Regional Climate Center (Data Range 1981-2010)

HYDROLOGY

Major hydrological features in the area include the Queen Creek Wash, Cross Canyon Wash, and two unnamed tributaries to Queen Creek Wash. Queen Creek Wash was identified by the Arizona Department of Environmental Quality (ADEQ) as a Category 5 impaired water due to high sample levels of copper, lead, and selenium. A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map shows a 100-year Flood Zone associated with all the washes and streams in the study area. Low-water crossings were identified at five locations during the field review. Flooding in the Flood Zone and at low-water crossings may impact transportation movement and limit access to residential areas and activity centers. In addition, roads prone to flooding experience significant pavement deterioration which increases maintenance needs and costs.

Figure 3.3 illustrates the location of the major hydrologic features, 100-year flood event boundaries, and location of low-water crossings. Roads with low water crossings include:

- Panther Drive (Queen Creek Wash)
- Telegraph Canyon Road (south of Panther Drive)
- Western Avenue (north of US60)
- Stone Avenue (north of US60)
- Stone Avenue (Queen Creek Wash)

Figure 3.3: Major Hydrologic Features and 100-Year Floodplain

ROADWAY CONDITIONS

Functional Classification

Functional classification is the process by which streets and highways are grouped into classes according to their role of moving traffic through a roadway network. Planners and engineers utilize this hierarchy to establish a roadway's design standards, speed, capacity, access management features, and land use development. Functional classification also impacts a roadway's eligibility for federal transportation funds for road improvements and maintenance. Besides US 60 and SR 177, the only roadways functional classified within Superior are: Main Street (Major Collector), Magma Avenue (Major Collector), Panther Drive (Minor Collector), and Sunset Drive (Minor Collector). Table 3.2 provides an overview of each FHWA approved classifications. Approved FHWA functional classifications for the study area are presented in Figure 3.4.

Figure 3.4: FHWA Approved Functional Classification

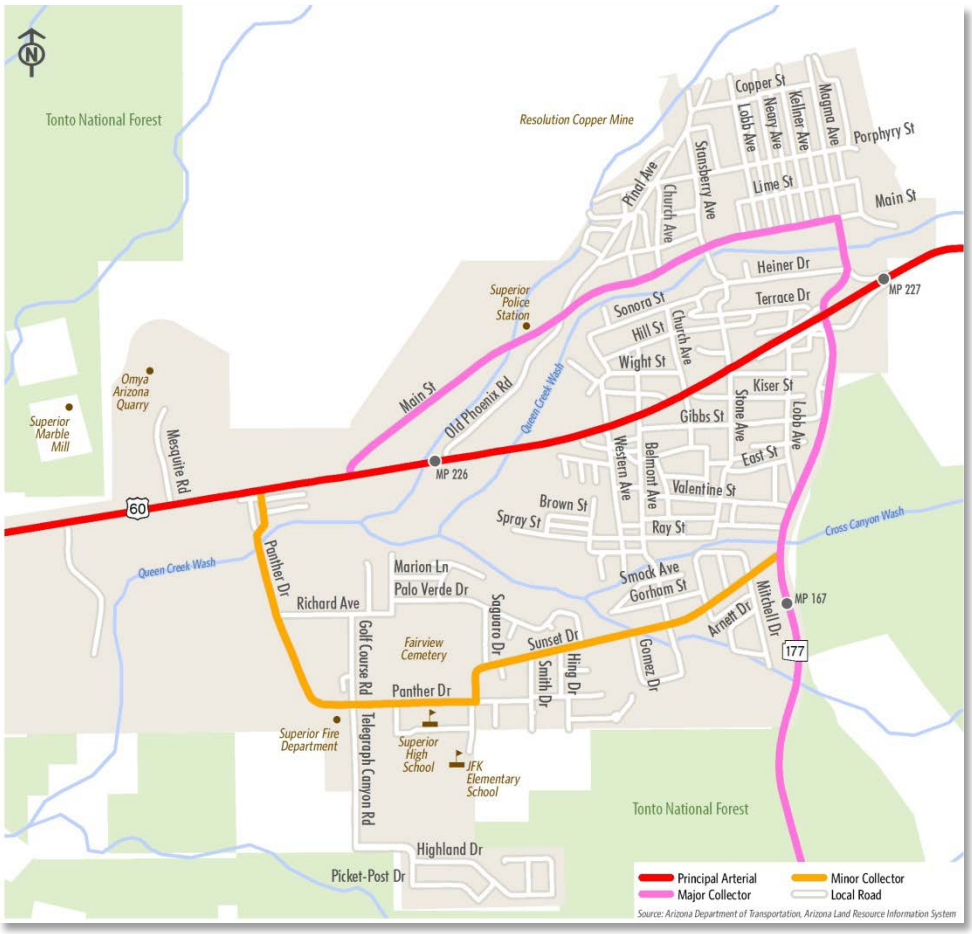


Table 3.2: FHWA Functional Classification Definition

Classification	Description
Interstate	Interstates are the highest classification of Arterials and were designed and constructed with mobility and long-distance travel in mind.
Principal Arterial	These roadways serve major centers of metropolitan areas, provide a high degree of mobility and can also provide mobility through rural areas. Principal Arterial roadways include driveways to specific parcels and at-grade intersections with other roadways.
Minor Arterial	Minor Arterials provide service for trips of moderate length and offer connectivity to the higher Arterial system. Minor Arterials in rural areas are typically designed to provide relatively high overall travel speeds, with minimum interference to through movement.
Collector	Collectors generally serve primarily intra-county travel and predominantly have shorter travel distances than on Arterial routes. Major Collector routes are longer in length, lower driveway densities, higher speed limits; higher traffic volumes, and may have more travel lanes than Minor Collectors.

Source: FHWA

Number of Lanes

A field review was conducted to inventory the number of lanes for major roadways in the study area. Figure 3.5 illustrates the locations of one/two-lane streets and one-directional roadways. Majority of the roadways are not striped but the pavement is wide enough to accommodate vehicles in both directions.

Figure 3.5: Number of Lanes

EXISTING TRAFFIC CONDITIONS

Traffic Counts

To measure existing traffic conditions, traffic counts were obtained from CAG for the year 2016 and from ADOT's MS2 Transportation Data Management System for the year 2015. Figure 3.6 illustrates 2015 and 2016 traffic counts compiled by ADOT and CAG respectively. The highest traffic counts in the study area are located on:

- US 60 east of Church Avenue – 10,580 (Year 2015)
- SR 177 – 2,481 (Year 2015)
- Magma Avenue south of Main Street – 2,104 (Year 2016)
- Main Street east of Stansberry Avenue – 1,415 (Year 2016)

Figure 3.6: Existing Traffic Counts

CRASH DATA ANALYSIS

Crash analysis was conducted to identify trends, patterns, predominant crash types, and high crash rate intersections and corridors. Data for crashes occurring between November 2010 and November 2015 was obtained from ADOT's Accident Location Identification Surveillance System (ALISS) database. During the five year period a total of 34 incidents occurred on study area roadways, of which 8 (23.5%) occurred on US-60. Figure 3.7 illustrates the location of crashes within the study area.

Major crash locations included:

- Belmont Avenue (4 crashes)
- SR 177/Sunset Drive intersection (3 crashes)
- Heiner Drive/Stansberry Avenue intersection (3 crashes)
- Heiner Drive/Magma Avenue/US 60 Exit 22 intersection (3 crashes)
- Main Street (3 crashes)

Additional key observations include:

- 3% of crashes were fatal
- 15% of crashes involved incapacitating injuries
- 38% of crashes were intersection related
- 22% of crashes were due to a rear-end or rear-to side collision
- 18% of crashes were due to a left-turn collision
- 17% of crashes involved colliding with a roadside object (i.e., curb, fence, guardrail)
- 15% of crashes involved colliding with a parked vehicle
- 67% of crashes occurred during the daylight

Pedestrian and Bicycle Involved Crashes

Pedestrians were involved in three crashes within the study area – one on US 60, one at the US 60/Belmont Avenue intersection, and one at the Church Avenue/Main Street intersection. There were no bicyclist incidents on the study roadways during the five year study period.

Figure 3.7: Crash Locations

PEDESTRIAN AND BICYCLE FACILITY CONDITIONS

Sidewalks and bicycle lanes are an integral part of a town's transportation system. The ability to efficiently and safely carry non-motorized travel within the Town is related directly to the conditions of the pedestrian and bicyclist facilities. For this study, the condition of sidewalks and bicycle lanes were assessed to aid in developing a comprehensive list of pavement improvements.

Sidewalk Conditions

Sidewalks were surveyed via a windshield survey to determine the condition of the sidewalk and the facility's conformation to Americans with Disabilities Act (ADA) standards. Sidewalks were inventoried and categorized into four condition types:

- **Good:** Sidewalk is free of major defects and is visually confirmed to conform to ADA requirements
- **Fair:** Sidewalk is free of major defects; non-conformance to ADA
- **Average:** Some cracking or minor faulting on the surface; non-conformance to ADA
- **Poor:** Major cracking, buckling, or faulting is observed on the sidewalk; non-conformance to ADA

Figure 3.8 shows the existing conditions of sidewalks within the town limits. The information is summarized in Table 3.3. Overall approximately 4 miles of sidewalks were recorded, of which about 40% are in poor condition.

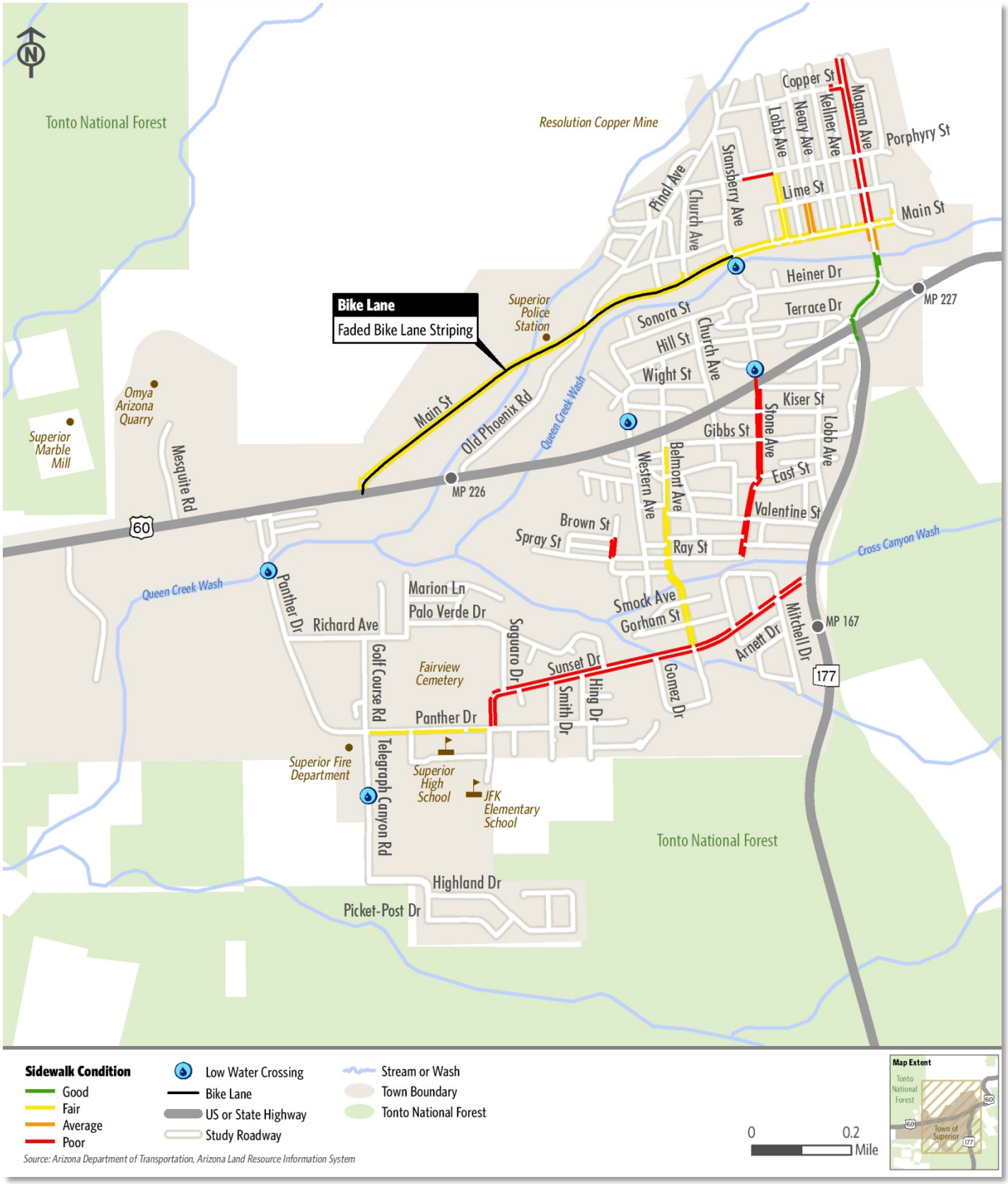
Table 3.3: Sidewalk Condition Ratings

Facility Location	From	To	Length (mi)	Condition
Main Street	US 60	High School Avenue	1.23	Fair
Magma Avenue	North of Copper Street	Main Street	0.34	Poor
Magma Avenue	Main Street	Queen Creek Wash	0.06	Average
Magma Avenue	Queen Creek Wash	South Street	0.19	Good
Neary Avenue	Lime Street	Main Street	0.07	Average
Lobb Avenue	Porphyry Street	Main Street	0.14	Fair
Porphyry Street	Garrott Avenue	Lobb Avenue	0.07	Poor
Copper Street	Kellner Avenue	Magma Avenue	0.03	Poor
Stone Avenue	US 60	Ray Street	0.36	Poor
Belmont Avenue	Gibbs Street	Sunset Drive	0.42	Fair
Edna Avenue	Brown Street	Spray Street	0.04	Poor
Sunset Drive	Panther Drive	SR 177	0.74	Poor
Panther Drive	Golf Course Road	Sunset Drive	0.25	Fair

Bicycle Facilities

To develop a better understanding of the multimodal activities within the Town, the location and condition of bicycle facilities were inventoried via a windshield survey. Currently Main Street from US 60 to Stansberry Avenue is the only roadway striped for a bike lane; however, the striping is faded.

Figure 3.8: Pedestrian and Bicycle Facility Conditions



4. FUTURE SOCIOECONOMIC AND TRAFFIC CONDITIONS

This section presents the future traffic volume projections and an analysis of socioeconomic conditions at the short-, mid-, and long-term milestones within the Town.

PROJECTED SOCIOECONOMIC CONDITIONS

The *2008 Town of Superior Small Area Transportation Study* previously developed population and employment growth projections for the Town to year 2030. Table 4.1 provides an overview of projected employment and population projects based on growth rates utilized in the previous study.

Table 4.1: Employment and Population Estimates for Years 2021, 2026, 2036

	Existing	Year 2021	Year 2026	Year 2036
Population	2,929	3,104	3,259	3,585
Households	1,333	1,426	1,493	1,626
Employment	688	758	817	934

Sources: Arizona Department of Administration, 2010-2014 American Community Survey, 2008 Town of Superior Small Area Transportation Study

FUTURE TRAFFIC CONDITIONS

The primary purpose of forecasting traffic volumes is to estimate the additional traffic added to existing roadways and to forecast the impact on pavement conditions. Analyzing future traffic conditions aids in the prioritization of pavement improvement projects and developing maintenance schedules. This section presents the forecasts for traffic conditions in the short- (year 2021), mid- (year 2026), and long-term (year 2036) phases. Traffic forecasts were obtained from the *2008 Town of Superior Small Area Transportation Study.*

Figures 4.1, 4.2, and 4.3 display the projected traffic volumes for the milestone years (2021, 2026, and 2036) respectively, on non-ADOT roadways. Study roadways with traffic volumes greater than 2,000 vehicles per day are shown in Tables 4.2.

Table 4.2: Roads with High Traffic Volume Forecasts

Short-Term (Year 2021)		
Belmont Avenue	Magma Avenue	Main Street
Panther Drive	Sunset Drive	
Mid-Term (Year 2026)		
Belmont Avenue	Magma Avenue	Main Street
Mesquite Drive	Palo Verde Drive	Panther Drive
Richard Avenue	Stone Avenue	Sunset Drive
Long-Term (Year 2036)		
Airport Road	Belmont Ave	Gibbs Street
Gomez Place	Highlands Drive	Hill Street
Kellner Avenue	Lobb Avenue	Magma Alley
Magma Avenue	Main Street	Mesquite Drive
Neary Avenue	Old Phoenix Road	Palo Verde Drive
Panther Drive	Richard Avenue	Stone Avenue
Sunset Drive	Valentine Street	

Figure 4.1: 2021 Traffic Conditions

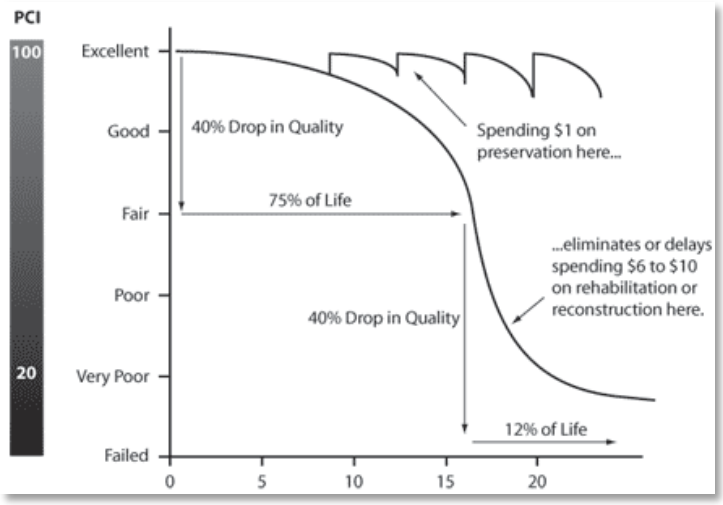
Figure 4.2: 2026 Traffic Conditions

Figure 4.3: 2036 Traffic Conditions

5. PAVEMENT CONDITION ASSESSMENT

Figure 5.1 displays how a street's pavement deteriorates over time. As shown in the graphic, when newly constructed, a street begins its life in excellent condition. Mid-way through the road's life, there is a 40% drop in the quality of the roadway's condition. After this point, there is a steep deterioration as pavements reach the "poor" condition. Timely preventive treatments can create substantial benefit/cost ratio by restoring pavements to a good condition and preventing rapid deterioration.

Figure 5.1: FHWA Typical Pavement Deterioration Curve



To determine the existing condition of roadways within the Town, the project team performed a detailed evaluation of 23.4 miles of Town maintained roadways. Pavement conditions were compiled via a comprehensive field assessment and video log that spanned three weeks in June/July 2016. The field assessment was designed and performed per guidelines set forth by the *ASTM D6433-11 "Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys."* The following section provides an overview of the methodology utilized to analyze roadway conditions.

IDENTIFICATION OF PAVEMENT FACILITIES

In order to seamlessly collect, store, and analyze pavement condition, a network of roadways to be inspected and inventoried was identified and divided into a series of manageable units based on usage, pavement composition, condition, etc. For this study, the study area roadways were subdivided into smaller units as: network – route - section - sample unit.

Network

Initially, the project team collaborated with Town officials to identify Town maintained roadways for inventory and analysis. The direction of travel, street length, width, ownership, and classification are among the items identified during this initial phase. Roadways identified that are unpaved or alleyways were omitted from the inventory. In total, the network includes 23.4 miles of roadways.

Route

A route is an identifiable segment of the network, such a road name or distinct function. For this study, the network was divided into branches based on its road name. Each route was given a unique ID number. In total there are 111 routes within the study network.

Section

Due to the large lengths of some corridors, a route will not have consistent characteristics throughout. To accommodate for these inconsistencies, routes were divided into sections based on various characteristics such as: crossing US 60, change in land use, change in pavement width or roadway condition, etc. In general, most routes have one or two sections.

This pavement section is the basic management unit used to display pavement condition rating and will ultimately have maintenance and rehabilitation strategies assigned at this level.

Sample Unit

For the purpose of the pavement condition assessment, each section was divided into smaller segments. Utilizing ASTM standards, requisite number of sample units (i.e., total section area divided by sample unit size) were identified for each section. Based on the *ASTM D6433-11* guidelines, sample units were identified for field survey. During the field assessment, manual inspection was performed at each sample unit to determine existing pavement distresses and conditions.

Each sample unit has a standard size, and is given a unique identifier such as R1-S1-SS1 (indicating Route 1 - Section 1 - Sample Segment 1). A random selection of sample units was implemented to identify locations which were inspected in the field. Distress data from the inspection process is used to calculate Pavement Condition Index (PCI) for each sample unit, and in turn, the PCI of each section is calculated based on the PCI values of the sample units within each section.

Approximately, 20% of the segments were surveyed and Figure 5.3 illustrates the location of sample units.

CONSTRUCTION HISTORY

Readily available construction history data was limited for this project. However, upon completion of the *1994 Superior SATS,* the Town completed a town-wide pavement maintenance project. Figure 5.2 illustrates roadway segments that were rehabilitated or reconstructed in 1995. As illustrated in the figure, the majority of roadways were still eligible for rehabilitation after the 1995 roadway maintenance project. However, improvements were made to Main Street, a portion of Sunset Drive, Porphyry Street, and a portion of Magma Avenue.

Figure 5.2: 1995 Town of Superior Road Maintenance Project

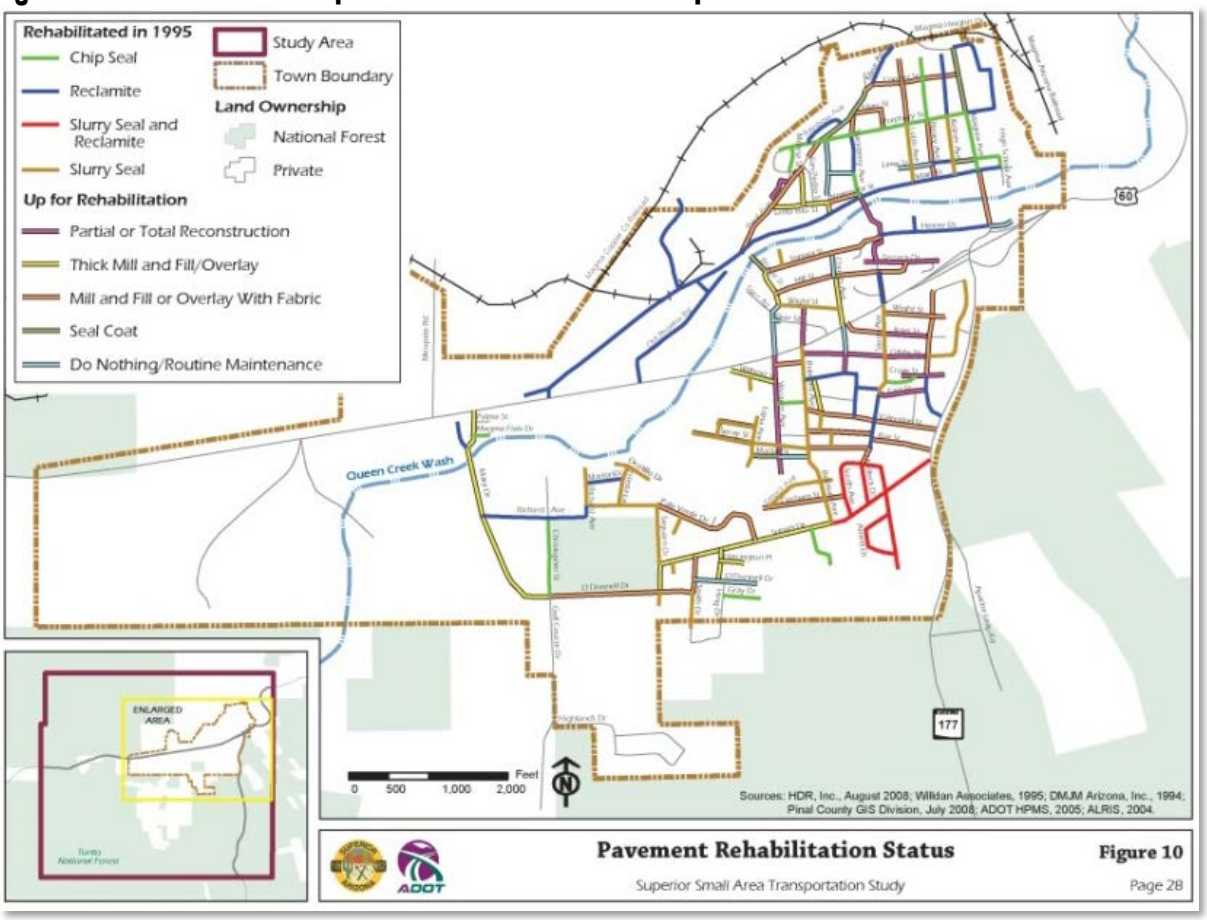
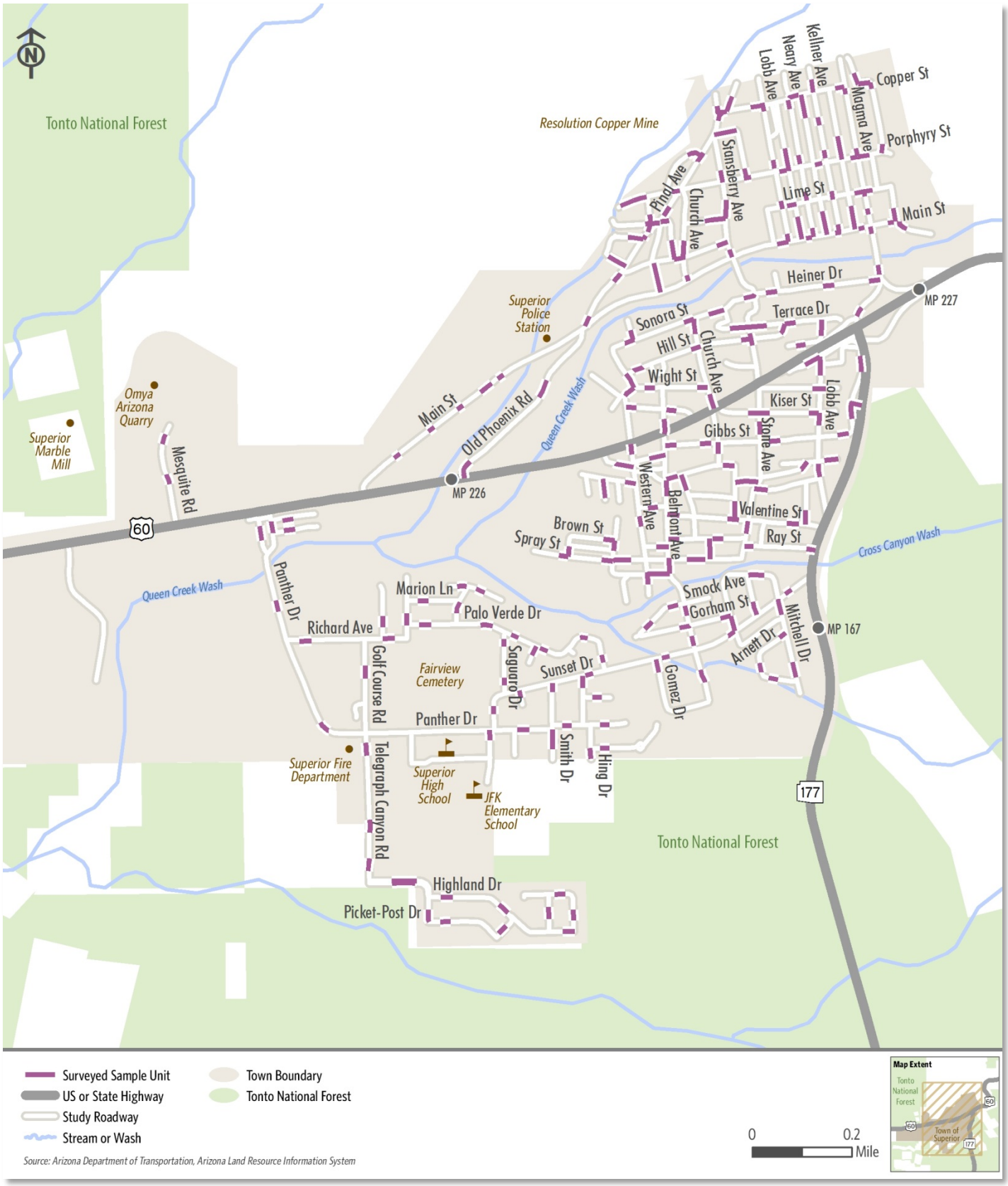


Figure 5.3: Survey Sample Units



PAVEMENT CONDITION ASSESSMENT METHODOLOGY

The following summarizes methods utilized for this study to survey and analyze pavement conditions. The assessment included a comprehensive field review as well as a windshield survey to obtain sidewalk conditions and to determine the overall roughness of a roadway.

Field Inspection

A field inspection was performed to quantify existing pavement distresses in order to evaluate the overall condition of the existing pavement. The roadway pavement condition survey is the primary means of obtaining and recording pavement distress data and ultimately computing the PCI for a section. The field inspection included evaluation, measurement, and assessment of observed distresses. The condition survey consisted principally of a visual inspection of the pavement surfaces for signs of pavement distress resulting from the influence of traffic, materials performance, and the environment. All inspections were completed in accordance with *ASTM D6433-11 "Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys."* For this study, all roads and sidewalks were surveyed by manual PCI techniques.

Observations of pavement distress type and severity were recorded on a field inspection form developed for this study. As shown in Figure 5.4, each sample unit was evaluated on the following distress types:

- Alligator Cracking
- Bleeding
- Block Cracking
- Bumps and Sags
- Corrugation
- Depression
- Edge Cracking
- Jt. Reflection Cracking
- Lane/Shoulder Drop off
- Longitudinal and Transverse Cracking
- Patching and Utility Cut Patching
- Polished Aggregate
- Potholes
- Railroad Crossing
- Rutting
- Shoving
- Slippage Cracking
- Swell
- Weathering/Raveling
- No Cracking

For each type of pavement distress the severity was recorded in three different magnitudes: Low, Medium, or High. The inspection forms also included the size, percentage, and a quick sketch of distress for each sample unit.

Figure 5.4: Sample Unit Pavement Condition Inspection Form

ASHPHALT SURFACED ROADS AND PARKING LOTS CONDITION SURVEY DATA SHEET FOR SAMPLE UNIT

Branch:	**Section:**	**Sample Unit:**
Surveyor: RP/VY	**Date:**	**Sample Area (LxW):**

1. Alligator Cracking	6. Depression	11. Patching & Util Cut Patching	16. Shoving
2. Bleeding	7. Edge Cracking	12. Polished Aggregate	17. Slippage Cracking
3. Block Cracking	8. Jt. Reflection Cracking	13. Potholes	18. Swell
4. Bumps and Sags	9. Lane/Shoulder Drop off	14. Railroad Crossing	19. Weathering/Raveling
5. Corrugation	10. Long & Trans Cracking	15. Rutting	20. No Cracking

Distress Cause:

Distress Type	Dist Sev	Quantity													Total	Density %	Deduct Value
		L	W	L	W	L	W	L	W	L	W	L	W	L	W			

Windshield Survey

In addition to field inspection, a windshield survey was also conducted for this study to obtain an overall perspective of the roughness of roadways and to collect sidewalk and bicycle facility conditions. The main purpose of this survey was to visually determine conditions of:

- **Pavement:** Determine the drivability and overall roughness of a section. Additionally, compare and assess field inspection pavement condition ratings against the overall visual assessment of the roadway segment.
- **Pedestrian Facilities:** Visual inventory of sidewalks and ADA facilities grouped in categories: good, fair, average, and poor
- **Bicycle Facilities:** Visual inventory of bicycle lanes within the study area and the condition of bicycle lane striping

The windshield survey included capturing a GPS-driven video of each corridor segment for verification of field results. Figure 5.5 provides an example of the windshield survey form utilized.

Figure 5.5: Sample Windshield Survey Inspection Form

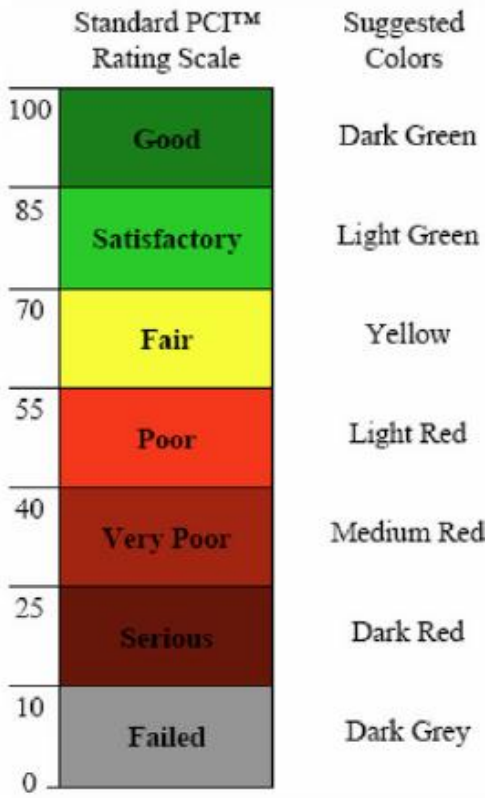
Route Num	Route Name	Section Num	Pavement Condition	Sidewalk Condition	Comments
1	AIRPORT RD	1			
1	AIRPORT RD	2			
2	MESQUITE DR	1			
3	PANTHER DR	1			
5	CARNEY ST	1			
6	PALMA ST	1			
7	MAGMA FLATS ST	1			
8	RICHARD AVE	1			
9	CHRISTOPHER AVE	1			
10	RICHARD AVE	1			
11	MARION DR	1			
12	OCOTILLO DR	1			
13	FRIEDA LN	1			
13	FRIEDA LN	2			
14	PALO VERDE DR	1			
14	PALO VERDE DR	2			
15	SAHUARO DR	1			
16	GOLF COURSE RD	1			

CONDITION RATING SYSTEM

The Pavement Condition Index (PCI) is a numerical rating of the pavement condition that ranges from 0 to 100 and indicates the general condition of a pavement. Developed by the United State Army Corps of Engineers, the method is based on a visual survey of the number, type, and extent of distresses in a pavement. The results of the analysis is a numerical value between 0 and 100, with 0 being the worst possible condition and 100 being the best possible condition. Figure 5.6 illustrates the standard PCI ratings along with recommended display colors.

Data collected during the field inspection and windshield survey were organized and analyzed using standards and guidelines outlined in the *ASTM D6433-11 "Standard Practice for Roads and Parking Lots Pavement Condition Index Surveys"* and the PCI rating was calculated for each segment. Condition ratings were calculated by determining the density of each distress type and the severity of the distress. Based on the percent of distress severity and type, a pavement condition deduction value was calculated. Finally, a PCI value was calculated based on the corrected value and categorized each PCI into the standard rating scale shown in Figure 5.6.

Figure 5.6: Standard PCI Rating System



SUMMARY OF PAVEMENT CONDITIONS

The following section presents findings of pavement conditions based on field inspection and windshield surveys conducted in July 2016.

Roadway Pavement Conditions

Pavement condition ratings were calculated for each section of paved roadway. Table 5.1 summarizes the total pavement condition results of the study roadways, while Table 5.2 provides a comprehensive list of pavement conditions by section. Figure 5.7 also provides a graphical illustration of survey results. Key observations of survey results include:

Table 5.1: Summary of Pavement Conditions

PCI Rating	Total Roadway Miles
Good	1.0
Satisfactory	2.6
Fair	2.8
Poor	5.3
Very Poor	6.6
Serious	4.0
Failed	1.1
Total	23.4

- **Poor Condition**
  - Telegraph Canyon Road: exclusively provides access to the residential development area on Highland Drive. Currently some transverse and longitudinal cracking is evident on the pavement; however, due to high vehicle usage that conditions could become worse and more expensive to maintain if not addressed soon.
  - Sunset Drive: major east-west roadway that connects Panther Drive, Superior High School, JFK Elementary School, residential communities, Belmont Avenue, and SR 177.
  - Pinal Avenue (south of Lime Street): major link between residential communities and major roads such as Porphyry Street, Copper Street, and Main Street
- **Very Poor Condition**
  - Panther Drive: major access route to residential areas from US 60, and to Superior High School and JFK Elementary School.
  - Stone Avenue (south of US60): major thoroughfare for residents residing in southeast Superior.
  - Western Avenue: major north-south route linking residential areas to US 60.
  - Stansberry Avenue (south of Lime Street): connects Main Street, Downtown Superior to US 60, and is one of the only Queen Creek Wash crossing points.
  - Porphyry Street: main thoroughfare within Superior's Downtown District that links commercial areas and residential areas between Magma Avenue, Stansberry Avenue, and Pinal Avenue.

Appendix A provides a comprehensive listing of pavement condition index ratings for each segment unit.

Table 5.2: Pavement Condition Survey Results

Road Name	From	To	PCI Rating
Airport Road	US 60	Wastewater Treatment Plant	Serious
Airport Road	Wastewater Treatment Plant	End	Serious
Alley	Copper Street	Main Street	Poor
Alley	Panther Drive	End	Good
Alley	Western Avenue	End	Serious
Alley	Lime Street	Main Street	Very Poor
Arnett Drive	Mitchell Drive	W. of Mitchell Drive	Very Poor
Arnett Drive	W. of Mitchell Drive	Mitchell Drive	Poor
Belmont Avenue	Martin Street	Sunset Drive	Satisfactory
Bridge Street	Sonora Street	Wight Street	Poor
Brown Street	Spray Street	Edna Avenue	Failed
Brown Street	Western Avenue	Belmont Avenue	Serious
Brown Street	Belmont Avenue	Stone Avenue	Serious
Bush Drive	W. of Thompson Drive	Highlands Drive	Good
Carney Street	US60	Panther Drive	Fair
Center Avenue	Crowe Street	Brown Street	Serious
Christopher Avenue	End	Richard Avenue	Poor
Church Avenue	Porphyry Street	Santa Rita Street	Serious
Church Avenue	Santa Rita Street	Main Street	Serious
Church Avenue	Crowe Street	Valentine Street	Fair
Church Avenue	Sonora Street	US60	Fair
Church Avenue	US60	Crowe Street	Poor
Coleman Alley	Porphyry Street	Lime Street	Very Poor
Contreras Street	East Street	Valentine Street	Satisfactory
Copper Street	Mine Avenue	Lobb Avenue	Satisfactory
Copper Street	Lobb Avenue	Magma Avenue	Fair
Copper Street	High School Avenue	High School Avenue	Poor
Crowe Street	Belmont Avenue	Church Avenue	Poor
Crowe Street	W. of Lobb Avenue	E. of Lobb Avenue	Poor
Duffy Drive	Sonora Street	Stansberry Avenue	Satisfactory
East Street	Stone Avenue	Lobb Avenue	Fair
Edna Avenue	Brown Street	Spray Street	Very Poor

Table 5.2: Pavement Condition Survey Results (Continued)

Road Name	From	To	PCI Rating
Edna Avenue	Wilhoyt Street	End	Serious
Empalme Street	Santa Rita Street	Main Street	Poor
Empalme Street	Pinal Avenue	Santa Rita Street	Poor
Frieda Ln	Marion Drive	Palo Verde Drive	Poor
Frieda Ln	Ocotillo Drive	Marion Ln	Poor
Garrott Avenue	Silver Street	Porphyry Street	Poor
Gibbs Street	Ray Road	SR177	Very Poor
Gibbs Street	Belmont Avenue	Ray Road	Very Poor
Golf Course Road	Richard Avenue	Panther Drive	Poor
Gomez Pl	Sunset Drive	Sunset Drive	Poor
Gorham Street	Smoke Avenue	South Avenue	Poor
Gray Drive	Hing Drive	End	Poor
Harrington Pl	Hing Drive	End	Very Poor
Heiner Drive	Church Avenue	Duffy Drive	Very Poor
Heiner Drive	Duffy Drive	Stansberry Avenue	Very Poor
Heiner Drive	Stansberry Avenue	Magma Avenue	Very Poor
High School Avenue	N. of Main Street	Main Street	Poor
High School Avenue	Magma Avenue	High School Avenue	Very Poor
High School Avenue	High School Avenue	High School Avenue	Serious
High School Avenue	High School Avenue	Porphyry Street	Fair
High School Avenue	Lime Street	N. of Main Street	Fair
Highlands Drive	Quail Drive	E. of Bush Drive	Good
Hill Street	Bridge Street	Terrace Drive	Serious
Hill Street	Terrace Drive	S. of Terrace Drive	Very Poor
Hill Street	S. of Terrace Drive	End	Very Poor
Hing Drive	Gray Drive	End	Very Poor
Hing Drive	Sunset Drive	O'Donnell Drive	Poor
Hing Drive	Smith Drive	Gray Drive	Poor
Kellner Avenue	N. of Copper Street	Copper Street	Failed
Kellner Avenue	Main Street	Copper Street	Serious
Kiser Street	Western Avenue	US60	Very Poor
Kiser Street	US60	Stone Avenue	Serious

Table 5.2: Pavement Condition Survey Results (Continued)

Road Name	From	To	PCI Rating
Kiser Street	Stone Avenue	E. of Lobb Avenue	Very Poor
Kumpke Ct	High School Avenue	End	Failed
Lime Street	W. of Molina Street	Pinal Avenue	Poor
Lime Street	Church Avenue	Stansberry Avenue	Fair
Lime Street	W. of Lobb Avenue	Magma Avenue	Very Poor
Lime Street	Magma Avenue	High School Avenue	Serious
Lobb Avenue	South Street	Kiser Street	Fair
Lobb Avenue	Kiser Street	SR177	Serious
Lobb Avenue	N. of Copper Street	Main Street	Very Poor
Magma Alley	Copper Street	Main Street	Serious
Magma Avenue	High School Avenue	Main Street	Satisfactory
Magma Avenue	Main Street	Queen Creek Wash	Fair
Magma Avenue	Queen Creek Wash	US60	Good
Magma Flats Street	Panther Drive	End	Satisfactory
Main Street	US60	Stansberry Avenue	Satisfactory
Main Street	Stansberry Avenue	Lobb Avenue	Satisfactory
Main Street	Lobb Avenue	High School Avenue	Fair
Marion Drive	Richard Avenue	Frieda Ln	Fair
Martin Street	Western Avenue	Belmont Avenue	Serious
Medlock Drive	South Avenue	Sunset DR	Failed
Mesquite Drive	US60	End	Very Poor
Mine Avenue	Copper Street	End	Very Poor
Mitchell Drive	Sunset Drive	S. of Arnett Drive	Fair
Moffatt Street	Church Avenue	Stone Avenue	Satisfactory
Moffatt Street	Stone Avenue	Crowe Street	Fair
Molina Street	Porphyry Street	Pinal Avenue	Serious
Neary Avenue	N. of Copper Street	Main Street	Very Poor
Newmont Street	Pinal Avenue	Stansberry Avenue	Very Poor
Nunez Pl	Sunset Drive	End	Very Poor
Ocotillo Drive	W. of Frieda Ln	E. of Frieda Ln.	Serious
O'Donnell Drive	US60	Smith Drive	Poor
O'Donnell Drive	Smith Drive	E. of Hing Drive	Very Poor

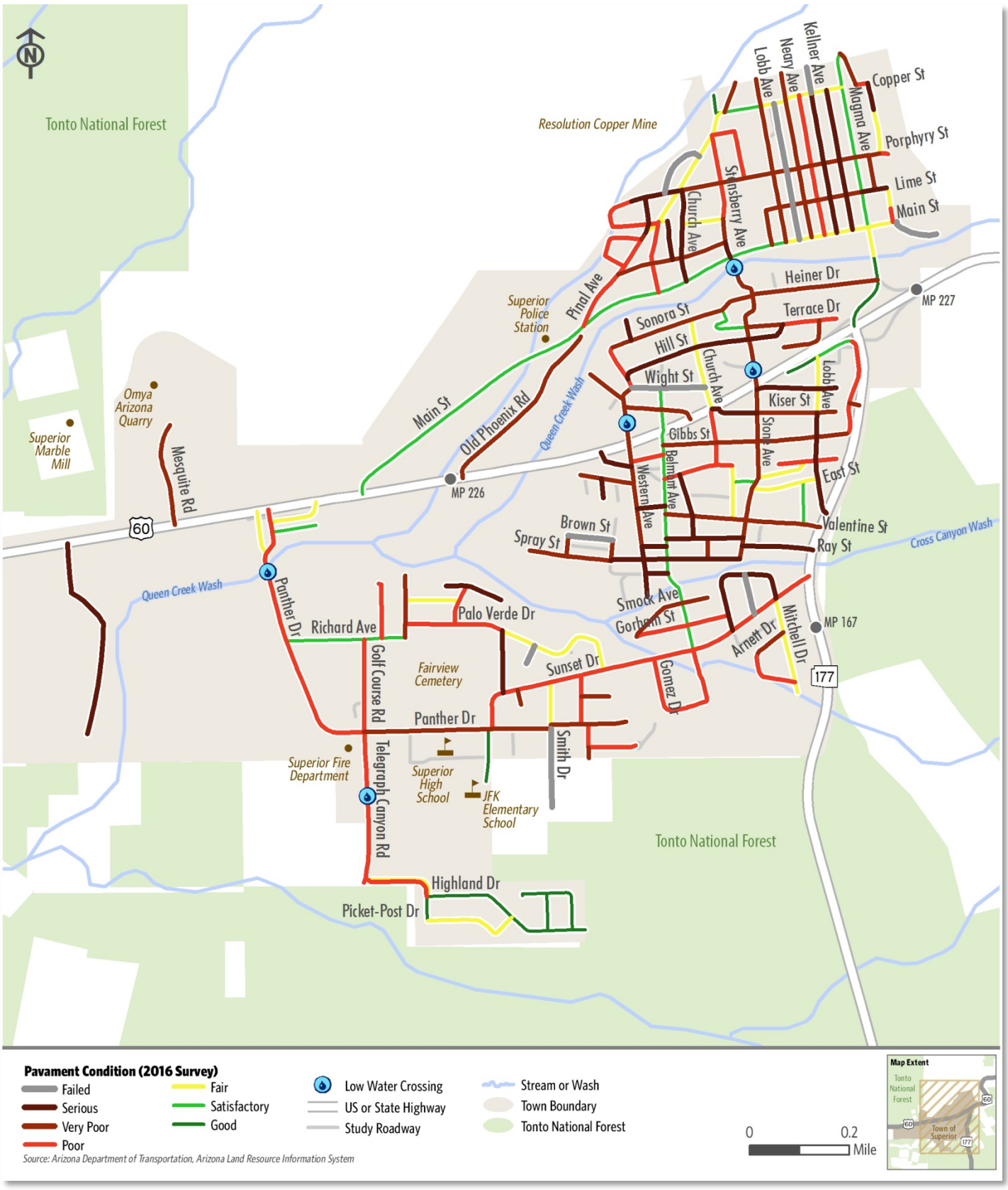
Table 5.2: Pavement Condition Survey Results (Continued)

Road Name	From	To	PCI Rating
O'Donnell Drive	US60	Smith Drive	Very Poor
Old Phoenix Road	S. of Main Street	US60	Very Poor
Palma Street	US60	Panther Drive	Fair
Palo Fierro Pl	Palo Verde Drive	End	Failed
Palo Verde Drive	Richard Avenue	Saguaro Drive	Poor
Palo Verde Drive	Saguaro Drive	Sunset Drive	Fair
Panther Drive	US60	Golf Course Road	Poor
Panther Drive	Golf Course Road	Smith Drive	Very Poor
Picket Post Drive	Quail Drive	Highlands Drive	Fair
Pinal Avenue	San Juan Street	Main Street	Poor
Pinal Avenue	Molina Street	San Juan Street	Very Poor
Pinal Avenue	Stansberry Avenue	Molina Street	Fair
Pinal Avenue	Copper Street	Stansberry Avenue	Fair
Pinal Avenue	N. of Copper Street	Copper Street	Good
Pisano Street	San Juan Street	Pinal Avenue	Poor
Porphyry Street	W. of Molina Street	Molina Street	Serious
Porphyry Street	Molina Street	Pinal Avenue	Serious
Porphyry Street	Pinal Avenue	Magma Avenue	Very Poor
Porphyry Street	Magma Avenue	High School Avenue	Very Poor
Porphyry Street	High School Avenue	End	Poor
Quail Drive	Golf Course Road	Highlands Drive	Fair
Quail Drive	Golf Course Road	Highlands Drive	Poor
Quail Drive	Highlands Drive	Picket Post Drive	Good
Rainbow Street	Pinal Avenue	Porphyry Street	Failed
Ray Road	South Street	Gibbs Street	Poor
Ray Street	Stone Avenue	SR177	Serious
Ray Street	Edna Avenue	Stone Avenue	Serious
Richard Avenue	N. of Mario Ln	Richard Avenue	Very Poor
Richard Avenue	Panther Drive	Richard Avenue	Satisfactory
Saguaro Drive	Palo Verde Drive	Sunset Drive	Serious
San Juan Street	Pisano Street	Pinal Avenue	Poor
San Pedro Street	Empalme Street	E. of Empalme Street	Fair
San Pedro Street	Begin	End	Serious
Silver Street	Pinal Avenue	Garrott Avenue	Poor

Table 5.2: Pavement Condition Survey Results (Continued)

Road Name	From	To	PCI Rating
Simpson Street	Western Avenue	Belmont Avenue	Poor
Smith Drive	Sunset Drive	O'Donnell Drive	Fair
Smith Drive	Panther Drive	End	Failed
Smock Avenue	Gorham Street	E. of Belmont Avenue	Very Poor
Sonora Street	Bridge Street	Church Avenue	Very Poor
South Avenue	Sunset Drive	Sunset Drive	Serious
South Avenue	Brown Street	Ray Street	Very Poor
South Street	Lobb Avenue	End	Good
South Street	Lobb Avenue	Ray Road	Satisfactory
Spray Street	Spray Street	End	Very Poor
Spray Street	Spray Street	Edna Avenue	Very Poor
Spray Street	Spray Street	Brown Street	Very Poor
Stansberry Avenue	Pinal Avenue	Porphyry Street	Poor
Stansberry Avenue	Porphyry Street	Uma Street	Poor
Stansberry Avenue	Santa Rita Street	Main Street	Serious
Stansberry Avenue	Ume Street	Santa Rita Street	Very Poor
Starr Road	Western Avenue	End	Very Poor
Stone Avenue	Main Street	Ray Street	Very Poor
Sunset Drive	Panther Drive	SR177	Poor
Telegraph Canyon Road	Panther Drive	Quail Drive	Poor
Terrace Drive	Stansberry Avenue	Hill Street	Very Poor
Terrace Drive	Terrace Drive	E. of Hill Street	Poor
Thompson Drive	Cherrywood Pl	Highlands Drive	Good
Unnamed Road	Sonora Street	End	Serious
Valentine Street	Western Avenue	Belmont Avenue	Serious
Valentine Street	Belmont Avenue	SR177	Very Poor
Walker Way	Copper Street	Main Street	Failed
Western Avenue	Wight Street	US60	Very Poor
Western Avenue	US60	Brown Street	Very Poor
Western Avenue	Brown Street	S. of Martin Street	Serious
Wight Street	Bridge Street	Church Avenue	Failed
Wight Street	Stone Avenue	E. of Lobb Avenue	Serious
Wilhoyt Street	W. of Edna Avenue	Western Avenue	Very Poor

Figure 5.7: Pavement Condition Survey Results



PAVEMENT AND SAFETY ISSUE HOTSPOTS

In addition to the pavement condition ratings, areas with minor and major potholes were identified to determine "hotspots" for safety issues and poor pavement conditions. Areas with high densities of potholes are typically where drainage is poor and vehicular traffic is the greatest. Figure 5.8 illustrates the location of potholes identified during the field assessment and high density pothole hotspots. As illustrated in the Figure, hotspot locations include:

- Wright Street
- Kellner Drive (particularly near Lime Street)
- Ray Street
- Sunset Drive
- Neary Avenue (North of Porphyry Street)
- Golf Course Drive

Figure 5.8: Pothole Locations and Hotspots

6. PAVEMENT TREATMENT STRATEGIES

This chapter presents a brief overview of potential pavement treatment strategies that were considered to address the maintenance and repair needs of the study area roadways. This section also discusses the benefits, unit costs, and the expected pavement life for each treatment strategy.

TREATMENT STRATEGIES

Choosing the right pavement treatment option is of crucial importance to effectively address the pavement distress type and to preserve and extend the pavement life. The type of treatment needed is dependent on several factors including the type and severity of distress, traffic volume levels, heavy vehicle volumes, weather conditions, and drainage condition.

Types of Pavement Maintenance

FHWA defines the three components of pavement maintenance as:

Preventive Maintenance

A planned strategy of cost-effective treatments to an existing roadway system and its appurtenances that preserves the system, retards future deterioration, and maintains or improves the functional condition of the system (without significantly increasing the structural capacity). Preventive maintenance treatments include crack sealing, fog sealing, and thin overlays.

Pavement Rehabilitation

Structural enhancements that extend the service life of an existing pavement and/or improve its load carrying capacity. Rehabilitation techniques include restoration treatments and structural overlays. Minor Rehabilitation consists of non-structural enhancements made to the existing pavement sections to eliminate age-related, top-down surface cracking that develops in flexible pavements due to environmental exposure. Major pavement rehabilitation consists of structural enhancements that both extend the service life of an existing pavement and/or improves its load-carrying capability.

Routine Maintenance

Consists of work that is planned and performed on a routine basis to maintain and preserve the condition of the highway system or to respond to specific conditions and events that restore the highway system to an adequate level of service.

There are no clear classifications of which treatments are preventive, rehabilitation, or routine; however, emphasizing preventive maintenance will help prevent or prolong the need for pavement rehabilitation. Table 6.1 provides a summary of pavement treatment strategies, approximate cost estimates, and the expected life of pavement maintenance treatments.

Table 6.1: Summary of Pavement Treatment Strategies

Pavement Treatment Strategy	Description	Pros/Cons	Unit Cost (Sq. Ft)	Expected Life
Fog Seal	A light application of diluted asphalt emulsion to renew surfaces and seal small cracks and surface voids.	*Pros:* Fog seals are inexpensive compared to other surface treatments. Only a distributor truck is required to apply the fog seal in most cases. *Cons:* If applied too heavily, could be slippery and hazardous for the road users. The expected life of the fog seal is far shorter than other surface treatments.	$0.06	3 - 4 Years
Crack Seal	Rout and/or clean 1/4" or greater expansion or working cracks and seal in AC or PCC pavements to prevent the passage of water through the surface crack into the pavement structure or subgrade.	*Pros:* Crack filling and sealing is probably the most important and cost effective preventive maintenance strategy. *Cons:* Crack sealing operations can be very labor intensive.	$2,200 per linear mile of cracks	3 – 5 Years
Sand Seal	Asphalt emulsion cover with sand. A sand seal is a spray application of asphalt emulsion followed with a light covering of fine aggregate, such as a clean sand or screenings. Although this is a simple operation, it can be useful in correcting a number of pavement flaws.	*Pros:* The sand seal generally provides a thicker coating on the pavement surface than the fog seal, resulting in a longer life expectancy. The sand seal on polished aggregate surfaces can provide additional skid resistance. *Cons:* Only fine cracks are filled and larger cracks tend to reappear.	$0.35	4 - 5 Years
Chip Seal	An application of asphalt emulsions or liquid paving grade asphalts (with additives) and then covering them with aggregate and rolling. Chip seals renew and protect pavements and restore skid.	*Pros:* Chip-sealing equipment is common in most areas. The roadway can be opened to low-speed traffic just after the application of the aggregate. *Cons:* Chip sealing requires constant attention and frequent adjustment of application rates of aggregate, and especially asphalt, to minimize chip loss, fly rock, bleeding, and other problems. Windshields can be damaged by the loose aggregate.	$0.40	6 - 7 Years
Slurry Seal	A mixture of emulsified asphalt, fine aggregate and additives applied in a very thin layer to renew surfaces and protect against moisture and air intrusion.	*Pros:* The seal prevents moisture and air intrusion in the pavement and improves skid resistance, corrects surface profile, fills potholes. *Cons:* A slurry surface is only a protectant layer on top of the existing surface, and does not form a permanent bond with the underlying pavement. A slurry will oxidize quickly and lose its black color within the first several months.	$0.35	3 - 5 Years

Table 6.1: Summary of Pavement Treatment Strategies (Continued)

Pavement Treatment Strategy	Description	Pros/Cons	Unit Cost (Sq. Ft)	Expected Life
Micro/Macro Surfacing	*Macro-Surfacing:* A specialized open-graded cold mixed asphalt. It consists of a single-graded aggregate, a polymer modified binder, fines and other additives. It is a hard wearing surfacing for pavement preservation and rehabilitation. It is similar to slurry surfacing in its application but is specialized for situations where noise reduction, drainage, and reduced crack reflectivity are desired. *Micro-Surfacing:* A mixture of emulsified, polymer modified asphalt, high quality fine aggregate, chemical and other additives to fill ruts, renew and protect pavements, restore skid, and release quickly to traffic.	*Pros:* Quicker cure time so traffic can be allowed on the road sooner. *Cons:* Requires special equipment that is heavier and sturdier. The cost is higher than a slurry- or chip-seal treatment.	$0.50	4 - 6 Years
Ultra-thin Bonded Wearing Course	A polymer modified asphalt emulsion membrane followed within seconds by an ultra-thin lift of high performance open-graded asphalt concrete mix, and immediate release to traffic. Renews and protects pavement, restores skid, and provides a strong bond to the existing surface.	*Pros:* Excellent adhesion to old surface, rapid construction and placement in one pass, quick opening to traffic, lower rolling noise. *Cons:* Does not correct structural deficiencies of the pavement and should be used on structurally sound pavement. Any alligator cracking or potholes must be addressed prior to application.		8 - 10 Years
Recycled Asphalt Concrete (AC)	*Processed Reclaimed Asphalt Pavement (RAP):* Reclaimed Asphalt Pavement that is milled, crushed and processed into an emulsion or hot mix asphalt at a central location and then paver placed onto a roadway. *Cold In-Place Recycling:* A distressed pavement that is milled several inches, sized, mixed with emulsion, repaved and compacted using a train of equipment in-place on the road. *Hot In-Place Recycling:* A distressed pavement that is milled an inch or two, heated, scarified, mixed with emulsion, repaved and compacted using a train of equipment in-place on the road.	*Pros:* The advantage of recycled asphalt is to save cost of aggregate material, due to high cost or shortage of aggregates. There is a profit/savings potential of $30.00-$80.00/ton recycled. *Cons:* Longer process and has the potential for quality issues if not administered properly	$2.50	8 - 10 Years

Table 6.1: Summary of Pavement Treatment Strategies (Continued)

Pavement Treatment Strategy	Description	Pros/Cons	Unit Cost (Sq. Ft)	Expected Life
Thin AC Overlay	A thin (up to 1 1/2") layer of hot mix is applied to the existing surface.	*Pros:* Long service; low lifecycle cost; can better preserve grade and slope; seals the surface; and can be constructed quickly, minimizing traffic delays. *Cons:* Cannot be applied over badly distressed pavements; are dependent on good bond development, otherwise the pavement could be structurally inadequate.	$1.00	4 - 6 Years
Structural Overlay	A layer of hot or cold bituminous mix that is sufficiently thick to add structural strength to the pavement. Usually 2" or greater.	*Pros:* When more strength is needed, it's time for a structural overlay, that is, one or more layers of new asphalt surfacing. The existing road should be in good shape, and any distresses should be fixed before the overlay is done. A good tack coat (a thin layer of asphalt applied to the old surface) is essential in bonding the old and new layers. *Cons:* Very expensive	$3.00	8 - 15 Years
Mill and Replace AC	Pavement milling (cold placing, asphalt milling, or profiling) is the process of removing at least part of the surface of a paved area such as a road, bridge, or parking lot. Milling removes anywhere from just enough thickness to level and smooth the surface to a full depth removal.	*Pros:* Mill and replace can greatly extend the life of a pavement at a lower cost than removal and replacement or reconstruction. *Cons:* Very expensive	$4.00	8 -10 Years
Reconstruction of AC	Removal of the existing pavement followed by fixing subgrade and drainage problems, and construction of a new pavement.	*Pros:* Completely remove the pavement section, base and possibly subgrade. Used only if there is complete failure of the pavement or base/subgrade failure. *Cons:* Most costly alternative	$6.50	More than 10 Years

PAVEMENT DISTRESS VS TREATMENT OPTIONS

Several factors should be considered when selecting an appropriate treatment for pavement maintenance. Factors include parameters such as traffic levels, road location, type of distress, as well as funding concerns. Table 6.2 provides guidelines to assist in identifying the appropriate pavement maintenance treatment.

Table 6.2: Guidelines for Pavement Treatment Selection

Pavement Conditions	Parameters	PAVEMENT TREATMENTS												
											Recycled Bituminous Pavement			
		Fog Seal	Crack Seal	Sand Seal	Std. Chip Seal	Macro-Surfacing	Modified Chip Seal	Slurry Seal	Micro-Surfacing	Ultra-thin Bonded Wearing Course	Processed RAP	Hot-in-Place Recycling	Cold-in-Place Recycling	Thin Hot Mix Overlay
Traffic (ADT) (Note: % Trucks should also be considered)	<1000	■	■	■	■	■	■	■	■	■	■	■	■	■
	1,000 – 4,000	■	■	■	■	■	■	■	■	■	?	■	■	■
	>4000	?	■	?	■	■	■	■	■	■	?	■	■	■
Rutting: An obvious depression in the pavement normally found in the wheel paths parallel to the side of the road	<3/8 inch	■	■	■	■	■	■	■	■	■	■	■	■	■
	3/8 - 1 inch	X	?	?	?	?	?	?	■	X	■	?	?	?
	> 1 inch	X	X	X	X	X	X	X	?	X	?	?	?	X
Alligator Cracking: Cracks in the pavement in a pattern similar to an alligator's skin	Low	?	■	■	■	■	■	X	■	■	■	■	■	■
	Moderate	X	?	?	■	■	?	X	?	?	?	■	■	■
	High	X	X	X	X	X	X	X	X	X	?	?	■	?
Longitudinal Cracking: Cracks in the pavement parallel to the direction of traffic	Low	?	■	■	■	■	■	■	■	■	■	■	■	■
	Moderate	X	■	?	■	■	■	?	?	?	?	■	■	■
	High	X	?	X	X	X	X	X	X	X	X	?	■	?
Transverse Cracking: Cracks in the pavement perpendicular to the direction of traffic	Low	?	■	■	■	■	■	■	■	■	■	■	■	■
	Moderate	X	■	?	■	■	?	?	?	?	?	■	■	■
	High	X	?	X	X	X	X	X	X	X	X	?	■	?
Surface Defects include dry surface, flushing, pavement bleeding, etc.	Dry	■	X	■	■	■	■	?	■	■	■	■	■	■
	Flushing	X	X	?	■	■	■	X	■	■	■	■	■	■
	Bleeding	X	X	X	?	■	■	■	■	■	■	■	■	■
	Variable	?	X	?	■	■	■	■	■	■	■	■	■	■
Raveling: A breaking of the surface with visibly loose pieces of aggregate	Low	■	X	■	■	■	■	■	■	■	■	■	■	■
	Moderate	?	X	■	■	■	■	■	■	■	■	■	■	■
	High	?	X	■	■	■	■	?	■	■	■	■	■	■
Potholes: Bowl-shaped holes similar to depressions	Low	X	■	■	■	■	■	■	■	■	■	■	■	■
	Moderate	X	?	?	?	?	?	?	?	X	■	?	■	■
	High	X	?	X	X	X	X	?	?	X	?	?	■	■
Stripping: Debonding of asphalt binder from the aggregate	Moisture Damage	X	X	X	X	X	X	X	X	X	X	?	?	X
Texture	Rough	X	X	?	?	?	?	■	■	■	■	■	■	■
Ride	Poor	X	X	X	X	X	X	■	?	■	■	■	■	■
Rural	Min. Turning	■	■	■	■	■	■	X	■	■	■	■	■	■
Urban	Max. Turning	■	■	?	■	■	■	■	■	■	■	■	■	■
Drainage	Poor	X	X	X	X	X	X	X	X	X	X	?	?	X
Snow Plow Use	High	■	■	■	?	■	■	■	■	■	■	■	■	■
Skid Resistance	Low	X	X	■	■	■	■	■	■	■	■	■	■	■
Initial Cost Concern	Low	■	■	■	■	■	■	■	■	■	■	■	■	■
	High	■	?	■	■	■	?	?	X	X	■	?	?	?
Life Cost Concern	Low	■	■	■	■	■	?	■	■	?	■	■	■	?
	High	?	■	?	?	■	■	?	■	■	■	■	■	?
Local Construction Quality	Low	X	?	X	X	■	?	X	■	■	?	X	X	?
	High	■	■	■	■	■	■	■	■	■	■	■	■	■
User-Delay $	High	?	?	?	?	■	?	?	■	■	?	?	?	?

Source: FHWA - A Pocket Guide to Asphalt Pavement Preservation

X Not Recommended ? Maybe Recommended ■ Recommended

7. PRIORITIZATION OF IMPROVEMENTS

This chapter presents the pavement improvement projects and the criteria used for evaluating the recommendations for the Town. Initial improvements were developed based on deficiencies and needs identified in the existing conditions analyses, traffic conditions, and the goals and objectives established by the study team and the TAC at the onset of the study.

PRIORITIZATION CRITERIA

The projects were evaluated using a set of prioritization criteria, including Pavement Condition Index (PCI), level of impact, safety improvement, level of development, traffic levels, and cost range. Each evaluation criteria was divided into ranges (low, medium, high) and weights were assigned to each of the ranges. Table 7.1 summarizes the criteria utilized to evaluate and to quantify the benefits of each potential improvement option.

Table 7.1: Prioritization Scale

Criteria	Criteria Weight	Benefit Scale	Scoring
1. Pavement Condition Index (PCI) General condition of the pavement surface based on pavement condition survey results	15% (maximum of 9 points)	Good Condition (Good - Fair)	3
		Poor Condition (Poor)	6
		Very Poor Condition (Very Poor - Failed)	9
2. Level of Impact Benefit of the improvement on the community	25% (maximum of 15 points)	Low	5
		Medium	10
		High	15
3. Safety Impact of improvement on areas with high number of crashes or high pothole density	10% (maximum of 6 points)	Low	2
		Medium	4
		High	6
4. Level of Development The extent to which the area adjacent to the roadway has been developed	10% (maximum of 6 points)	Low density development	2
		High density development	4
		Major activity centers or businesses	6
5. Traffic Levels Level of current and projected traffic volumes	20% (maximum of 12 points)	Low	4
		Medium	8
		High	12
6. Cost Range Cost of the project based on size and magnitude of repair needed	20% (maximum of 12 points)	High Costs	4
		Medium Costs	8
		Low Costs	12
	Total Score	**60 points**	

Figures 7.1 - 7.6 provide a graphic illustration of the criteria scoring for each of the above criterions.

Figure 7.1: Prioritization Scoring - Pavement Condition

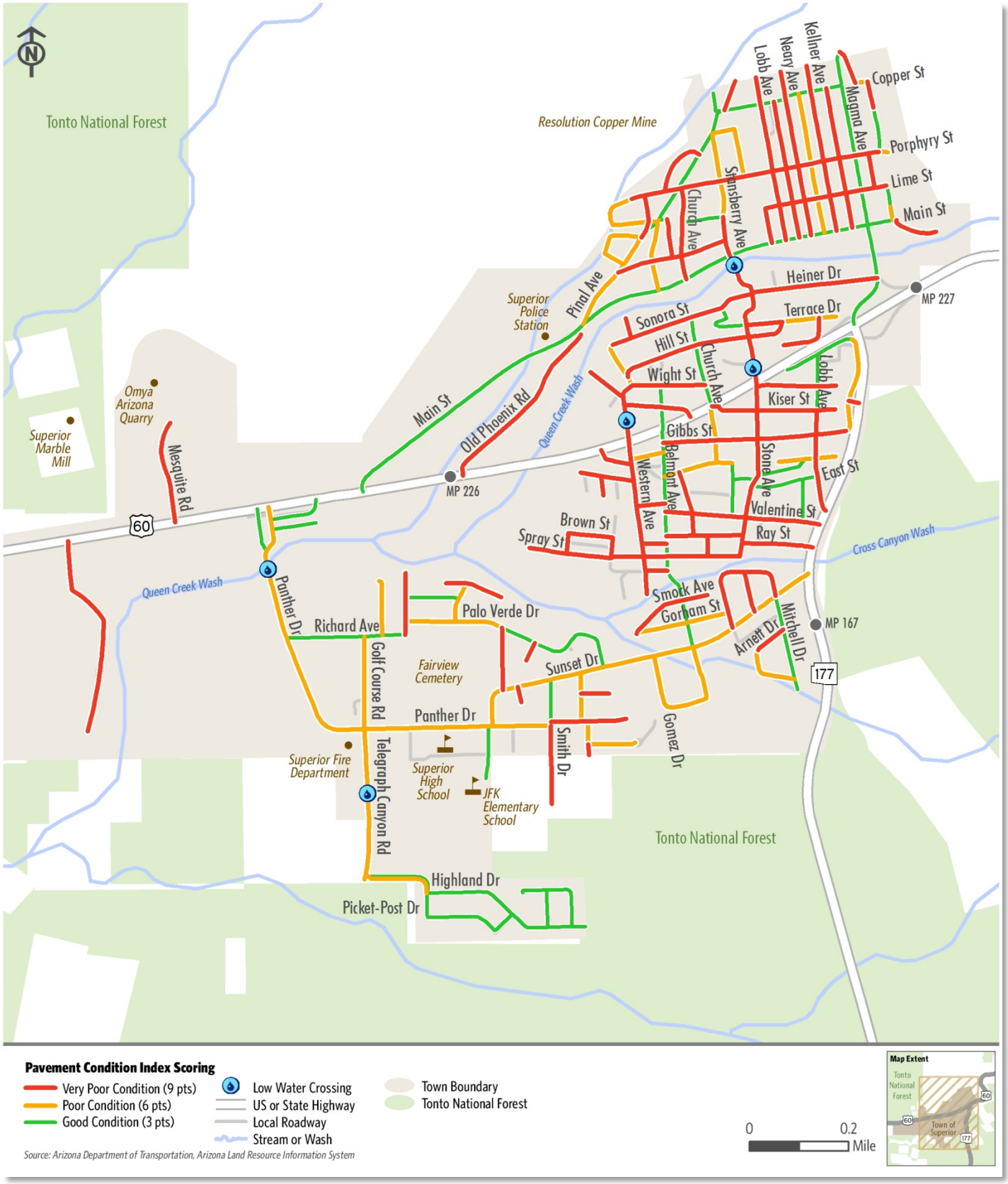


Figure 7.2: Prioritization Scoring - Level of Impact

Figure 7.3: Prioritization Scoring - Safety

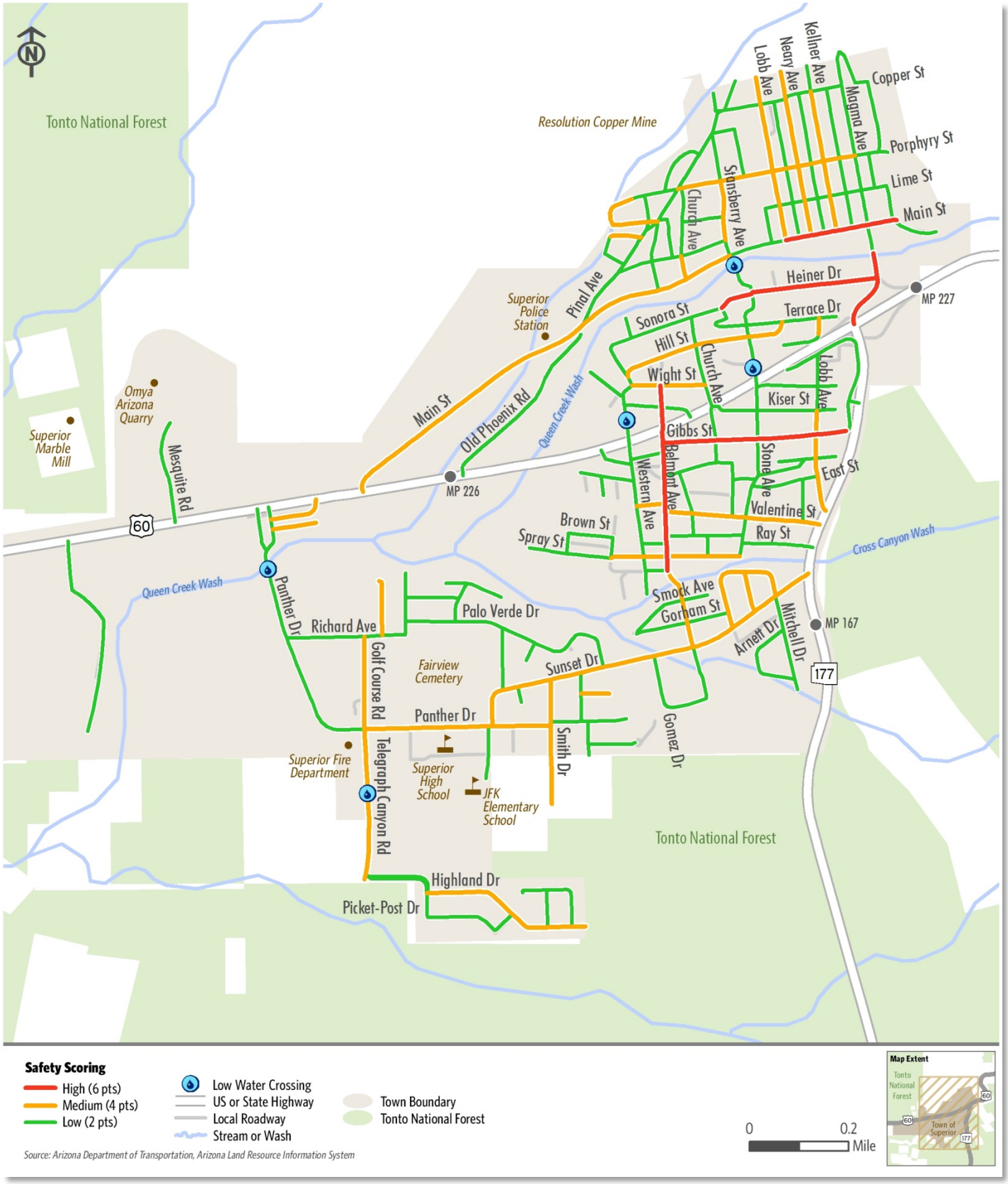
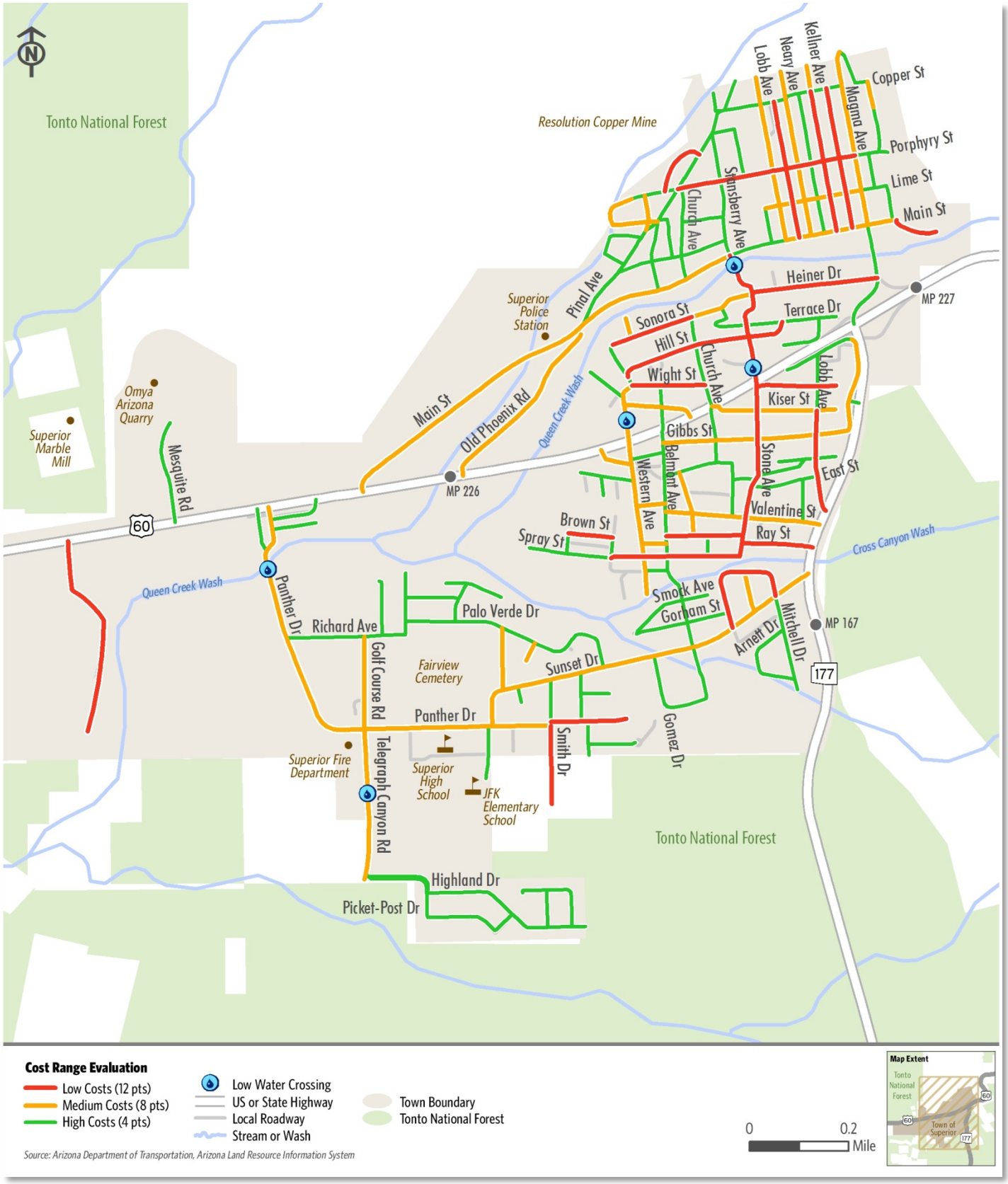


Figure 7.4: Prioritization Scoring - Level of Development

Figure 7.5: Prioritization Scoring - Traffic Levels

Figure 7.6: Prioritization Scoring - Cost Range



PRIORITIZATION OF PAVEMENT IMPROVEMENTS

In order to enhance mobility, safety, and access, the roadway pavement improvements were evaluated for each roadway Route and Section within the Study Area. Each Route and Section was evaluated based on the prioritization scale in Table 7.1 and prioritized by the total score of the criteria. Table 7.2 presents a summary of the pavement improvements and identify the most effective improvements for the Town.

Table 7.2: Prioritization of Pavement Improvements

Road Name	From	To	Length	PCI	Level of Impact	Safety	Develop-ment	Traffic Levels	Cost	Total Score	Treatment
Airport Road	US 60	Wastewater Treatment Plant	0.3	9	5	2	2	8	4	30	Pave dirt road
Airport Road	Wastewater Treatment Plant	End	0.1	9	5	2	2	4	4	26	Pave dirt road
Alley	Lime Street	Main Street	0.1	9	5	2	4	4	12	36	Mill and Replace AC
Alley	Copper Street	Main Street	0.3	6	5	2	4	8	12	37	Slurry Seal
Alley	Panther Drive	End	0.1	3	5	2	6	4	12	32	Crack Seal
Alley	Western Avenue	End	0.1	9	10	2	2	4	8	35	Mill and Replace AC
Arnett Drive	Mitchell Drive	W. of Mitchell Drive	0.1	9	5	2	4	4	12	36	Slurry Seal
Arnett Drive	W. of Mitchell Drive	Mitchell Drive	0.1	6	5	2	4	4	12	33	Thin AC Overlay
Belmont Avenue	Wight Street	Martin Street	0.4	3	15	6	6	12	12	54	Slurry Seal
Belmont Avenue	Martin Street	Sunset Drive	0.2	3	15	4	4	12	12	50	Sand Seal
Bridge Street	Sonora Street	Wight Street	0.1	6	5	2	4	4	12	33	Thin AC Overlay
Brown Street	Spray Street	Edna Avenue	0.1	9	5	2	2	4	4	26	Reconstruction
Brown Street	Western Avenue	Belmont Avenue	0.1	9	5	2	2	4	8	30	Mill and Replace AC
Brown Street	Belmont Avenue	Stone Avenue	0.2	9	5	2	4	4	4	28	Mill and Replace AC
Bush Drive	W. of Thompson Drive	Highlands Drive	0.2	3	5	2	4	4	12	30	Crack Seal
Carney Street	US 60	Mary Drive	0.1	3	5	2	2	4	12	28	Thin AC Overlay
Center Avenue	Crowe Street	Brown Street	0.1	9	5	2	2	4	8	30	Mill and Replace AC
Christopher Avenue	Richard Avenue	End	0.1	6	5	4	2	4	12	33	Slurry Seal
Church Avenue	Porphyry Street	Santa Rita Street	0.1	9	5	2	2	4	12	34	Thin AC Overlay
Church Avenue	Santa Rita Street	Main Street	0.1	9	5	4	2	4	12	36	Thin AC Overlay
Church Avenue	Crowe Street	Valentine Street	0.1	3	5	2	2	4	12	28	Sand Seal
Church Avenue	Sonora Street	US 60	0.2	3	10	2	6	4	12	37	Slurry Seal
Church Avenue	US 60	Crowe Street	0.1	6	10	2	6	4	12	40	Slurry Seal
Coleman Alley	Porphyry Street	Lime Street	0.1	9	5	2	4	4	12	36	Thin AC Overlay
Contreras Street	East Street	Valentine Street	0.1	3	5	2	4	4	12	30	Slurry Seal
Copper Street	Mine Avenue	Lobb Avenue	0.1	3	10	2	2	4	12	33	Sand Seal
Copper Street	Lobb Avenue	Magma Avenue	0.2	3	10	2	2	4	12	33	Sand Seal
Copper Street	High School Avenue	High School Avenue	0.0	6	5	2	2	4	12	31	Slurry Seal
Crowe Street	Belmont Avenue	Church Avenue	0.1	6	5	2	2	4	12	31	Thin AC Overlay
Crowe Street	W. of Lobb Avenue	E. of Lobb Avenue	0.1	6	5	2	4	4	12	33	Thin AC Overlay
Duffy Drive	Sonora Street	Stansberry Avenue	0.1	3	5	2	2	4	12	28	Crack Seal
East Street	Stone Avenue	Lobb Avenue	0.1	3	5	2	4	4	12	30	Slurry Seal
Edna Avenue	Brown Street	Spray Street	0.0	9	5	2	2	4	12	34	Thin AC Overlay
Edna Avenue	Wilhoyt Street	End	0.0	9	5	2	2	4	12	34	Mill and Replace AC

Table 7.2: Prioritization of Pavement Improvements (Continued)

Road Name	From	To	Length	PCI	Level of Impact	Safety	Develop-ment	Traffic Levels	Cost	Total Score	Treatment
Empalme Street	Pinal Avenue	Santa Rita Street	0.1	6	5	2	2	4	12	31	Slurry Seal
Empalme Street	Santa Rita Street	Main Street	0.1	6	5	2	2	4	12	31	Slurry Seal
Frieda Lane	Ocotillo Drive	Marion Lane	0.0	6	5	2	2	4	12	31	Slurry Seal
Frieda Lane	Marion Drive	Palo Verde Drive	0.1	6	5	2	2	4	12	31	Slurry Seal
Garrott Avenue	Silver Street	Porphyry Street	0.1	6	5	2	2	4	12	31	Slurry Seal
Gibbs Street	Ray Road	SR 177	0.0	9	10	2	2	4	12	39	Slurry Seal
Gibbs Street	Belmont Avenue	Ray Road	0.4	9	10	6	4	8	8	45	Thin AC Overlay
Golf Course Road	Richard Avenue	Quail Drive	0.5	6	10	4	2	8	8	38	Slurry Seal
Gomez Place	Sunset Drive	Sunset Drive	0.3	6	5	2	2	8	12	35	Sand Seal
Gorham Street	Smoke Avenue	South Avenue	0.2	6	5	2	4	8	12	37	Slurry Seal
Gray Drive	Hing Drive	End	0.1	6	5	2	2	4	12	31	Slurry Seal
Harrington Place	Hing Drive	End	0.1	9	5	4	4	4	12	38	Thin AC Overlay
Heiner Drive	Church Avenue	Duffy Drive	0.1	9	5	2	4	4	8	32	Mill and Replace AC
Heiner Drive	Duffy Drive	Stansberry Avenue	0.1	9	5	6	4	4	8	36	Mill and Replace AC
Heiner Drive	Stansberry Avenue	Magma Avenue	0.3	9	5	6	4	8	4	36	Mill and Replace AC
High School Avenue	Lime Street	N. of Main Street	0.0	3	10	2	6	4	12	37	Sand Seal
High School Avenue	N. of Main Street	Main Street	0.0	6	10	2	6	4	12	40	Slurry Seal
High School Avenue	Magma Avenue	High School Avenue	0.1	9	5	2	2	4	12	34	Slurry Seal
High School Avenue	High School Avenue	High School Avenue	0.1	9	5	2	2	4	8	30	Mill and Replace AC
High School Avenue	High School Avenue	Porphyry Street	0.1	3	5	2	2	4	12	28	Sand Seal
Highlands Drive	Quail Drive	E. of Bush Drive	0.4	3	10	4	4	8	12	41	Crack Seal
Hill Street	Bridge Street	Terrace Drive	0.4	9	5	4	4	8	4	34	Mill and Replace AC
Hill Street	Terrace Drive	S. of Terrace Drive	0.0	9	5	4	2	4	12	36	Thin AC Overlay
Hill Street	S. of Terrace Drive	End	0.1	9	5	2	2	4	12	34	Thin AC Overlay
Hing Drive	Smith Drive	Gray Drive	0.1	6	5	2	2	4	12	31	Thin AC Overlay
Hing Drive	Gray Drive	End	0.0	9	5	2	2	4	12	34	Thin AC Overlay
Hing Drive	Sunset Drive	O'Donnell Drive	0.1	6	5	2	4	4	12	33	Thin AC Overlay
Kellner Avenue	Main Street	Copper Street	0.1	9	5	2	4	4	8	32	Mill and Replace AC
Kellner Avenue	N. of Copper Street	Copper Street	0.3	9	5	4	4	8	4	34	Mill and Replace AC
Kiser Street	Western Avenue	US 60	0.1	9	5	2	2	4	8	30	Thin AC Overlay
Kiser Street	US 60	Stone Avenue	0.1	9	5	2	4	4	8	32	Mill and Replace AC
Kiser Street	Stone Avenue	E. of Lobb Avenue	0.2	9	5	2	4	4	8	32	Thin AC Overlay
Kumpke Ct	High School Avenue	End	0.1	9	10	2	6	4	4	35	Reconstruction
Lime Street	W. of Molina Street	Pinal Avenue	0.2	6	5	4	2	4	8	29	Thin AC Overlay
Lime Street	Church Avenue	Stansberry Avenue	0.1	3	5	2	2	4	12	28	Slurry Seal
Lime Street	W. of Lobb Avenue	Magma Avenue	0.2	9	10	2	6	8	8	43	Thin AC Overlay
Lime Street	Magma Avenue	High School Avenue	0.1	9	10	2	6	4	12	43	Thin AC Overlay

Table 7.2: Prioritization of Pavement Improvements (Continued)

Road Name	From	To	Length	PCI	Level of Impact	Safety	Develop-ment	Traffic Levels	Cost	Total Score	Treatment
Lobb Avenue	South Street	Kiser Street	0.1	3	5	2	2	4	12	28	Slurry Seal
Lobb Avenue	Kiser Street	SR 177	0.2	9	5	4	4	8	4	34	Mill and Replace AC
Magma Alley	Copper Street	Main Street	0.3	9	5	2	4	8	4	32	Mill and Replace AC
Magma Avenue	High School Avenue	Main Street	0.4	3	15	2	4	12	8	44	Sand Seal
Magma Avenue	Main Street	Queen Creek Wash	0.1	3	15	2	2	12	12	46	Sand Seal
Magma Avenue	Queen Creek Wash	US 60	0.2	3	15	6	2	12	12	50	Sand Seal
Magma Flats Street	Mary Drive	End	0.1	3	5	4	2	4	12	30	Sand Seal
Main Street	US 60	Stansberry Avenue	0.9	3	15	4	6	12	8	48	Sand Seal
Main Street	Stansberry Avenue	Lobb Avenue	0.1	3	15	2	6	12	12	50	Sand Seal
Main Street	Lobb Avenue	High School Avenue	0.2	3	15	6	6	12	8	50	Sand Seal
Marion Drive	Richard Avenue	Frieda Lane	0.1	3	5	2	4	4	12	30	Sand Seal
Martin Street	Western Avenue	Belmont Avenue	0.0	9	5	2	2	4	12	34	Mill and Replace AC
Medlock Drive	South Avenue	Sunset DR	0.1	9	5	4	2	4	8	32	Reconstruction
Mesquite Drive	US 60	End	0.2	9	5	2	6	8	12	42	Slurry Seal
Mine Avenue	Copper Street	End	0.1	9	5	2	2	4	12	34	Thin AC Overlay
Mitchell Drive	Sunset Drive	S. of Arnett Drive	0.2	3	5	2	4	8	12	34	Slurry Seal
Moffatt Street	Church Avenue	Stone Avenue	0.1	3	5	2	2	4	12	28	Crack Seal
Moffatt Street	Stone Avenue	Crowe Street	0.1	3	5	2	4	4	12	30	Crack Seal
Molina Street	Porphyry Street	Pinal Avenue	0.1	9	5	2	2	4	8	30	Mill and Replace AC
N. of Copper Street	Main Street		0.3	9	5	4	4	8	8	38	Thin AC Overlay
Neary Avenue	N. of Copper Street	Main Street	0.3	9	5	4	4	8	8	38	Thin AC Overlay
Newmont Street	Pinal Avenue	Stansberry Avenue	0.2	9	5	2	2	8	12	38	Slurry Seal
Nunez Place	Sunset Drive	End	0.0	9	5	2	2	4	12	34	Thin AC Overlay
Ocotillo Drive	W. of Frieda Lane	E. of Frieda Lane.	0.1	9	5	2	2	4	12	34	Thin AC Overlay
O'Donnell Drive	Smith Drive	E. of Hing Drive	0.2	9	5	2	4	4	4	28	Mill and Replace AC
Old Phoenix Road	S. of Main Street	US 60	0.4	9	5	2	2	8	8	34	Thin AC Overlay
Palma Street	US 60	Mary Drive	0.1	3	5	4	4	4	12	32	Slurry Seal
Palo Fierro Place	Palo Verde Drive	End	0.0	9	5	2	4	4	8	32	Reconstruction
Palo Verde Drive	Richard Avenue	Saguaro Drive	0.2	6	10	2	4	8	12	42	Slurry Seal
Palo Verde Drive	Saguaro Drive	Sunset Drive	0.3	3	10	2	4	8	12	39	Sand Seal
Panther Drive	US 60	Golf Course Road	0.6	6	15	2	6	12	8	49	Slurry Seal
Panther Drive	Golf Course Road	Smith Drive	0.4	6	15	4	2	8	8	43	Slurry Seal
Picket Post Drive	Quail Drive	Highlands Drive	0.2	3	5	2	4	8	12	34	Crack Seal
Pinal Avenue	San Juan Street	Main Street	0.2	6	10	2	4	8	12	42	Slurry Seal
Pinal Avenue	Molina Street	San Juan Street	0.0	9	10	2	4	4	12	41	Slurry Seal
Pinal Avenue	Stansberry Avenue	Molina Street	0.2	3	10	2	4	8	12	39	Slurry Seal
Pinal Avenue	Copper Street	Stansberry Avenue	0.1	3	10	2	2	4	12	33	Slurry Seal

Table 7.2: Prioritization of Pavement Improvements (Continued)

Road Name	From	To	Length	PCI	Level of Impact	Safety	Develop-ment	Traffic Levels	Cost	Total Score	Treatment
Pinal Avenue	N. of Copper Street	Copper Street	0.1	3	5	2	2	4	12	28	Crack Seal
Pisano Street	San Juan Street	Pinal Avenue	0.1	6	5	2	2	4	12	31	Slurry Seal
Porphyry Street	W. of Molina Street	Molina Street	0.0	9	5	2	2	4	12	34	Thin AC Overlay
Porphyry Street	Molina Street	Pinal Avenue	0.1	9	5	2	2	4	12	34	Thin AC Overlay
Porphyry Street	Pinal Avenue	Magma Avenue	0.4	9	10	4	6	8	4	41	Mill and Replace AC
Porphyry Street	Magma Avenue	High School Avenue	0.1	9	5	2	4	4	12	36	Thin AC Overlay
Porphyry Street	High School Avenue	End	0.0	6	5	2	2	4	12	31	Thin AC Overlay
Quail Drive	Golf Course Road	Highlands Drive	0.2	3	10	2	2	4	12	33	Sand Seal
Quail Drive	Golf Course Road	Highlands Drive	0.1	6	10	2	2	4	12	36	Slurry Seal
Quail Drive	Highlands Drive	Picket Post Drive	0.1	3	5	2	4	4	12	30	Crack Seal
Rainbow Street	Pinal Avenue	Porphyry Street	0.1	9	5	2	2	4	4	26	Reconstruction
Ray Road	South Street	Gibbs Street	0.2	6	10	2	2	8	8	36	Thin AC Overlay
Ray Street	Stone Avenue	SR 177	0.1	9	5	2	4	4	4	28	Mill and Replace AC
Ray Street	Edna Avenue	Stone Avenue	0.3	9	10	4	4	8	4	39	Mill and Replace AC
Richard Avenue	N. of Mario Lane	Richard Avenue	0.1	9	10	2	4	8	12	45	Slurry Seal
Richard Avenue	Mary Drive	Richard Avenue	0.2	3	10	2	2	8	12	37	Slurry Seal
Saguaro Drive	Palo Verde Drive	Sunset Drive	0.1	9	5	2	4	4	8	32	Thin AC Overlay
San Juan Street	Pisano Street	Pinal Avenue	0.1	6	5	4	2	4	12	33	Slurry Seal
San Pedro Street	Empalme Street	E. of Empalme Street	0.0	3	5	2	2	4	12	28	Slurry Seal
San Pedro Street	Santa Rita Street	End	0.1	9	5	2	2	4	12	34	Thin AC Overlay
Silver Street	Pinal Avenue	Garrott Avenue	0.1	6	5	2	2	4	12	31	Slurry Seal
Simpson Street	Western Avenue	Belmont Avenue	0.1	6	5	2	2	4	12	31	Slurry Seal
Smith Drive	Sunset Drive	O'Donnell Drive	0.1	3	5	4	4	4	12	32	Sand Seal
Smith Drive	Panther Drive	End	0.2	9	5	4	2	4	4	28	Reconstruction
Smock Avenue	Gorham Street	E. of Belmont Avenue	0.2	9	5	2	4	4	12	36	Slurry Seal
Sonora Street	Bridge Street	Church Avenue	0.2	9	5	2	4	4	4	28	Mill and Replace AC
South Avenue	Sunset Drive	Sunset Drive	0.3	9	5	4	2	8	4	32	Mill and Replace AC
South Avenue	Brown Street	Ray Street	0.0	9	5	2	4	4	12	36	Thin AC Overlay
South Street	Lobb Avenue	End	0.1	3	5	2	2	4	12	28	Crack Seal
South Street	Lobb Avenue	Ray Road	0.1	3	5	2	2	4	12	28	Crack Seal
Spray Street	Spray Street	End	0.1	9	5	2	2	4	12	34	Thin AC Overlay
Spray Street	Spray Street	Edna Avenue	0.1	9	5	2	2	4	12	34	Thin AC Overlay
Spray Street	Spray Street	Brown Street	0.0	9	5	2	2	4	12	34	Thin AC Overlay
Stansberry Avenue	Pinal Avenue	Porphyry Street	0.1	6	5	2	2	4	12	31	Slurry Seal
Stansberry Avenue	Porphyry Street	Ume Street	0.1	6	10	4	2	8	12	42	Slurry Seal
Stansberry Avenue	Ume Street	Santa Rita Street	0.1	9	10	4	2	8	12	45	Thin AC Overlay
Stansberry Avenue	Santa Rita Street	Main Street	0.0	9	10	2	2	8	12	43	Thin AC Overlay

Table 7.2: Prioritization of Pavement Improvements (Continued)

Road Name	From	To	Length	PCI	Level of Impact	Safety	Develop-ment	Traffic Levels	Cost	Total Score	Treatment
Starr Road	Western Avenue	End	0.1	9	5	2	2	4	12	34	Thin AC Overlay
Stone Avenue	Main Street	Ray Street	0.6	9	15	2	6	8	4	44	Thin AC Overlay
Sunset Drive	Mary Drive	SR 177	0.8	6	15	4	6	12	8	51	Slurry Seal
Terrace Drive	Stansberry Avenue	Hill Street	0.1	9	5	2	4	4	12	36	Thin AC Overlay
Terrace Drive	Terrace Drive	E. of Hill Street	0.1	6	5	2	4	4	12	33	Thin AC Overlay
Thompson Drive	Cherrywood Place	Highlands Drive	0.1	3	5	2	4	4	12	30	Crack Seal
Unnamed Road	Sonora Street	End	0.0	9	5	2	2	4	8	30	Reconstruction
Valentine Street	Western Avenue	Belmont Avenue	0.1	9	5	4	2	4	8	32	Mill and Replace AC
Valentine Street	Belmont Avenue	SR 177	0.3	9	5	4	4	8	8	38	Thin AC Overlay
Walker Way	Copper Street	Main Street	0.3	9	5	2	4	8	4	32	Mill and Replace AC
Western Avenue	Wight Street	US 60	0.1	9	10	2	6	4	8	39	Mill and Replace AC
Western Avenue	US 60	Brown Street	0.2	9	15	2	6	8	8	48	Thin AC Overlay
Western Avenue	Brown Street	S. of Martin Street	0.1	9	15	2	2	4	8	40	Mill and Replace AC
Wight Street	Bridge Street	Church Avenue	0.2	9	10	4	4	4	4	35	Reconstruction
Wight Street	Stone Avenue	E. of Lobb Avenue	0.2	9	5	2	2	4	4	26	Mill and Replace AC
Wilhoyt Street	W. of Edna Avenue	Western Avenue	0.1	9	5	2	2	4	12	34	Slurry Seal

Summary of Recommended Treatments

The following is a summary of recommended treatments by mileage:

- Slurry Seal: 7.18 miles
- Thin AC Overlay: 5.89 miles
- Mill and Replace AC: 4.39 miles
- Sand Seal: 3.49 miles
- Crack Seal: 1.41 miles
- Reconstruction: 0.77 miles
- Pave Dirt Road: 0.42 miles

8. FUNDING SOURCES

This section discusses available funding sources that will aid in implementation of the recommended improvements.

EXISTING FUNDING SOURCES

Paved roads require routine maintenance such as patching, crack sealing, repair and cleaning, and striping. The successful implementation of the *Superior Pavement Assessment Study* is contingent upon the availability of funding for design and construction of improvements. Primary funding sources for the area include Highway User Revenue Funds (HURF), federal programs, ADOT, and other regional government agencies such as CAG.

Highway User Revenue Fund (HURF)

The State of Arizona taxes motor fuels and collects a variety of fees relating to the registration and operation of motor vehicles in the state. These collections include gasoline and use fuel taxes, motor carrier fees, vehicle license taxes, motor vehicle registration fees, and other miscellaneous fees. These revenues are distributed to the cities, towns, and counties of the state and to the State Highway Fund, which is administered by ADOT. These taxes and fees represent a source of revenue available for highway-related expenses. In fiscal year 2016, the HURF distribution to Pinal County was $19.1 million, of which $212,169 was allocated to the Town. Additionally, if the HURF exchange program is renewed, the Town can utilize the program to exchange Federal Surface Transportation Program funds for HURF funds.

SUPPLEMENTARY FUNDING SOURCES

Pinal Regional Transportation Authority (RTA)

In addition to the funding allocated from the Highway User Revenue Fund, the Town has an opportunity to obtain additional funding from the Pinal RTA for projects which improve local roadways. The Town is one of four jurisdictions which will receive $300,000 per year of available revenues to be utilized on local roadway development if the regional transportation plan and tax is approved by Pinal County voters.

Potential Federal Funding

The Federal government allocates a certain amount of money for roadway improvements and other development activities through grants. Grants such as the Community Development Block Grant Program (CDBG) are administered by the Arizona Department of Housing and can be used on projects such as property acquisition; construction or reconstruction of streets, sidewalks, pathways; and planning activities.

9. MAINTENANCE AND REPAIR PLAN

This section presents the Maintenance and Repair Plan for the short (2016-2021), mid (2022-2026), and long-term (2027-2036) planning horizons. During discussions with Town staff, the Town anticipates spending $250,000 per year on pavement maintenance projects. Utilizing this estimate, the Town may have approximately $1,250,000 available to spend on pavement preservation during the short-term phase.

Based on the prioritization process discussed in Chapter 7 and potential funding availability, a three-phased (short-, mid-, long-term) maintenance and repair plan has been developed to address the Town's pavement repair needs. Recommended short-term improvements are provided in Tables 9.1 – 9.2 and illustrated in Figure 9.1. Tables 9.3 – 9.6 and Figures 9.2 – 9.3 present the mid- and long-term recommendations, respectively. If additional funding becomes available, projects from the mid- and long-term phases could be implemented earlier.

In addition to the projects identified, it is recommended that the Town conduct preventive maintenance activities on a regular basis and utilize the guidelines presented in Table 6.2 to identify appropriate treatment methods.

Note: Cost estimates developed for the projects are planning level costs and are based on typical per-mile/foot construction costs in 2016 dollars. Estimated costs for each project are expressed in 2016 dollars and do not include costs associated with right-of-way acquisitions and drainage improvements. Actual costs for projects could vary at the time of implementation; therefore, a detailed analysis may need to be performed on a case-by-case basis to determine actual costs. Unless otherwise noted, the recommended projects are not yet funded. The costs include 15% for design (except crack seal projects) and a 10% contingency.

RECOMMENDED SHORT-TERM IMPROVEMENTS

Recommended short-term (2016-2021) pavement treatment options and their estimated costs are presented in Table 9.1. Table 9.2 summarizes the total mileage and cost for the short-term phase. Figure 9.1 provides an illustration of the recommended improvements for the short-term phase.

Table 9.1: Recommended Short-Term Improvements

Road Name	From	To	Length	PCI Value	PCI Rating	Recommended Treatment	Treatment Category	Cost
Belmont Avenue	Wight Street	Martin Street	0.37	81.0	Satisfactory	Slurry Seal	Preventative	$19,398
Sunset Drive	Panther Drive	SR177	0.76	45.0	Poor	Slurry Seal & Fix Hump at Gomez Place	Rehabilitation	$93,503 **cost estimate assumes $20,000 to fix the hump*
Belmont Avenue	Martin Street	Sunset Drive	0.17	75.0	Satisfactory	Sand Seal	Preventative	$11,652
Magma Avenue	Queen Creek Wash	US60	0.16	90.0	Good	Sand Seal	Preventative	$11,944
Main Street	Stansberry Avenue	Lobb Avenue	0.12	80.0	Satisfactory	Sand Seal	Preventative	$9,688
Main Street	Lobb Avenue	High School Avenue	0.23	68.0	Fair	Sand Seal	Preventative	$29,597
Panther Drive	US60	Golf Course Road	0.55	51.0	Poor	Slurry Seal	Rehabilitation	$60,185
Main Street	US60	Stansberry Avenue	0.90	77.0	Satisfactory	Sand Seal	Preventative	$95,704
Western Avenue	US60	Brown Street	0.21	37.0	Very Poor	Thin AC Overlay	Rehabilitation	$42,484
Magma Avenue	Main Street	Queen Creek Wash	0.06	70.0	Fair	Sand Seal	Preventative	$6,516
Gibbs Street	Belmont Avenue	Ray Road	0.37	33.0	Very Poor	Thin AC Overlay	Rehabilitation	$66,554
Richard Avenue	N. of Marion Lane	S. of Palo Verde Drive	0.12	30.0	Very Poor	Slurry Seal	Rehabilitation	$8,067
Stansberry Avenue	Lime Street	Newmont Street	0.05	33.0	Very Poor	Thin AC Overlay	Rehabilitation	$8,679
Magma Avenue	High School Avenue	Main Street	0.36	71.0	Satisfactory	Sand Seal	Preventative	$44,915
Stone Avenue	Main Street	Ray Street	0.64	29.0	Very Poor	Thin AC Overlay	Rehabilitation	$110,901
Golf Course Road	Richard Avenue	Quail Drive	0.49	50.0	Poor	Slurry Seal	Rehabilitation	$29,494
Lime Street	W. of Lobb Avenue	Magma Avenue	0.20	29.0	Very Poor	Thin AC Overlay	Rehabilitation	$46,936
Lime Street	Magma Avenue	High School Avenue	0.05	20.0	Serious	Thin AC Overlay	Rehabilitation	$15,238
Panther Drive	Golf Course Road	Smith Drive	0.38	51.0	Very Poor	Thin AC Overlay	Rehabilitation	$60,185
Stansberry Avenue	Santa Rita Street	Main Street	0.03	12.0	Serious	Thin AC Overlay	Rehabilitation	$10,450
Mesquite Drive	US60	End	0.21	39.0	Very Poor	Slurry Seal	Rehabilitation	$15,382
Palo Verde Drive	Richard Avenue	Saguaro Drive	0.20	54.0	Poor	Slurry Seal	Rehabilitation	$13,097

Note: Average crack seal costs $2,200 per linear mile. Actual cost estimates may vary based on the amount of cracks.

Table 9.1: Recommended Short-Term Improvements (Continued)

Road Name	From	To	Length	PCI Value	PCI Rating	Recommended Treatment	Treatment Category	Cost
Pinal Avenue	San Juan Street	Main Street	0.21	53.0	Poor	Slurry Seal	Rehabilitation	$15,171
Stansberry Avenue	Porphyry Street	Lime Street	0.07	50.0	Poor	Slurry Seal	Rehabilitation	$3,387
Highlands Drive	Quail Drive	E. of Bush Drive	0.35	90.0	Good	Crack Seal	Preventative	$2,200
Pinal Avenue	Molina Street	San Juan Street	0.02	40.0	Very Poor	Slurry Seal	Rehabilitation	$1,803
Porphyry Street	Pinal Avenue	Magma Avenue	0.36	27.0	Very Poor	Mill and Replace AC	Rehabilitation	$426,095
		TOTAL	**7.64**					**$1,259,225**

Note: Average crack seal costs $2,200 per linear mile. Actual cost estimates may vary based on the amount of cracks.

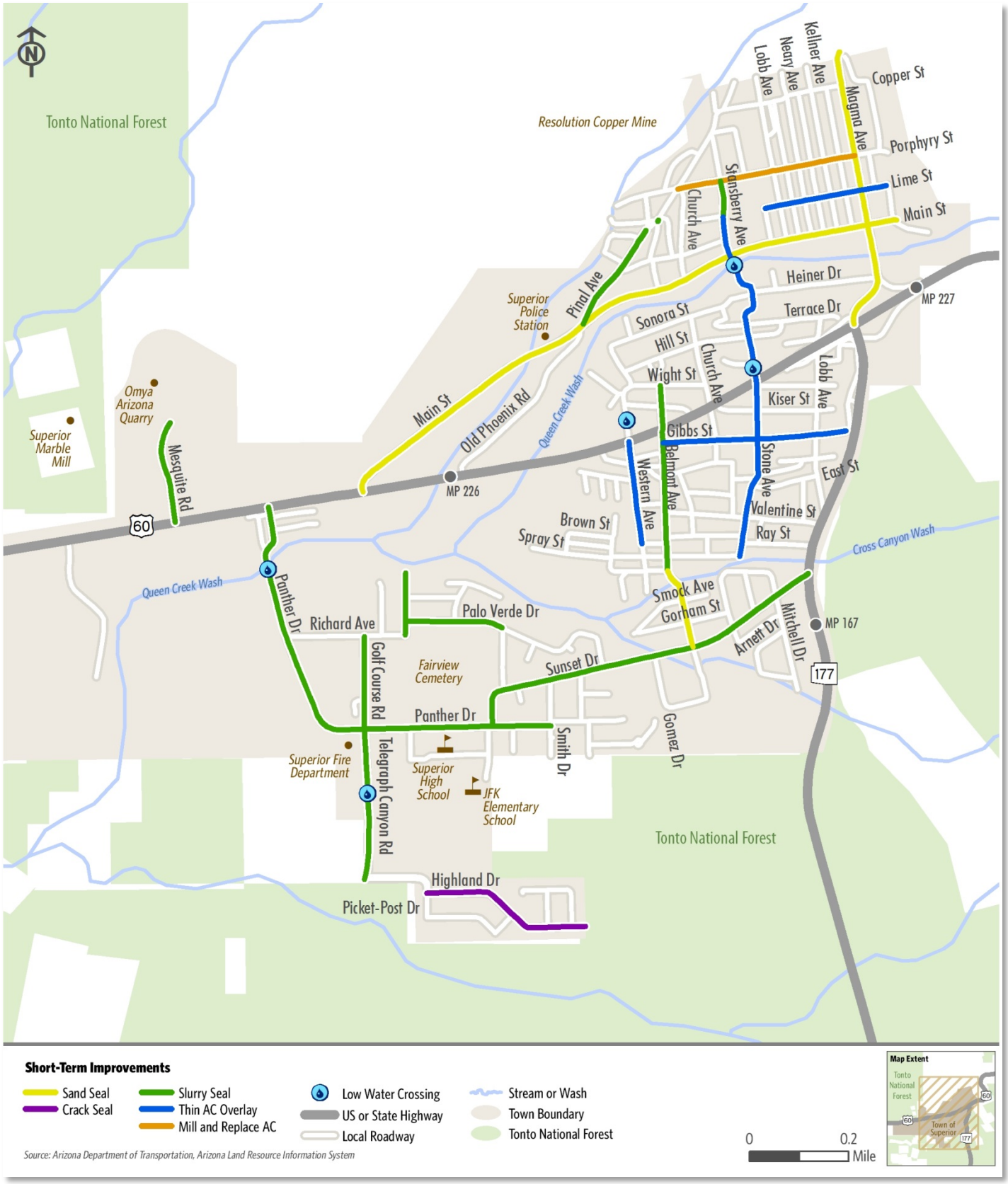
Summary of Short-Term Recommended Treatments

Table 9.2 summarizes recommended treatments for the short-term phase.

Table 9.2: Summary of Recommended Short-Term Improvements

Recommended Treatment	Total Length	Estimated Cost
Preventative	**2.72**	**$ 231,614**
Crack Seal	0.35	$2,200
Sand Seal	2	$210,016
Slurry Seal	0.37	$19,398
Rehabilitation	**4.92**	**$1,027,611**
Mill and Replace AC	0.36	$426,095
Slurry Seal	3.01	$300,274
Thin AC Overlay	1.55	$301,242
TOTAL	**7.64**	**$1,259,225**

Figure 9.1: Recommended Short-Term Improvements



RECOMMENDED MID-TERM IMPROVEMENTS

Recommended mid-term (2022-2026) pavement treatment options and their estimated costs are presented in Table 9.3. Table 9.4 summarizes the total mileage and cost for the mid-term phase. Figure 9.2 provides an illustration of the recommended improvements for the mid-term phase.

Table 9.3: Recommended Mid-Term Improvements

Road Name	From	To	Length	PCI Value	PCI Rating	Recommended Treatment	Treatment Category	Cost
Church Avenue	US60	Crowe Street	0.11	50.0	Poor	Slurry Seal	Rehabilitation	$7,814
High School Avenue	N. of Main Street	Main Street	0.03	41.0	Poor	Slurry Seal	Rehabilitation	$1,530
Western Avenue	Brown Street	S. of Martin Street	0.10	20.0	Serious	Mill and Replace AC	Rehabilitation	$64,325
Gibbs Street	Ray Road	SR177	0.02	30.0	Very Poor	Slurry Seal	Rehabilitation	$2,052
Palo Verde Drive	Saguaro Drive	Sunset Drive	0.27	68.0	Fair	Sand Seal	Preventative	$24,119
Pinal Avenue	Stansberry Avenue	Molina Street	0.23	58.0	Fair	Slurry Seal	Preventative	$17,131
Ray Street	Edna Avenue	Stone Avenue	0.26	14.0	Serious	Mill and Replace AC	Rehabilitation	$120,640
Western Avenue	Wight Street	US60	0.12	30.0	Very Poor	Mill and Replace AC	Rehabilitation	$79,950
Harrington Place	Hing Drive	End	0.06	30.0	Very Poor	Thin AC Overlay	Rehabilitation	$13,428
Lobb Avenue	Main Street	No. of Cooper Street	0.33	30.0	Very Poor	Thin AC Overlay	Rehabilitation	$87,769
Neary Avenue	N. of Copper Street	Main Street	0.34	37.0	Very Poor	Thin AC Overlay	Rehabilitation	$77,033
Newmont Street	Pinal Avenue	Stansberry Avenue	0.23	33.0	Very Poor	Slurry Seal	Rehabilitation	$15,533
Valentine Street	Belmont Avenue	SR177	0.31	37.0	Very Poor	Thin AC Overlay	Rehabilitation	$57,751
Alley	Copper Street	Main Street	0.29	40.0	Poor	Slurry Seal	Rehabilitation	$9,573
Church Avenue	Sonora Street	US60	0.18	59.0	Fair	Slurry Seal	Preventative	$8,543
Gorham Street	Smoke Avenue	South Avenue	0.19	45.0	Poor	Slurry Seal	Rehabilitation	$12,754
High School Avenue	Lime Street	N. of Main Street	0.04	63.0	Fair	Sand Seal	Preventative	$3,276
Richard Avenue	Panther Drive	Richard Avenue	0.24	77.0	Satisfactory	Slurry Seal	Rehabilitation	$15,478
Alley	Lime Street	Main Street	0.07	33.0	Very Poor	Mill and Replace AC	Rehabilitation	$5,000
Arnett Drive	Mitchell Drive	W. of Mitchell Drive	0.07	30.0	Very Poor	Slurry Seal	Rehabilitation	$5,785
Church Avenue	Santa Rita Street	Main Street	0.05	16.0	Serious	Thin AC Overlay	Rehabilitation	$15,548

Note: Average crack seal costs $2,200 per linear mile. Actual cost estimates may vary based on the amount of cracks.

Table 9.3: Recommended Mid-Term Improvements (Continued)

Road Name	From	To	Length	PCI Value	PCI Rating	Recommended Treatment	Treatment Category	Cost
Coleman Alley	Porphyry Street	Lime Street	0.07	33.0	Very Poor	Thin AC Overlay	Rehabilitation	$8,374
Heiner Drive	Duffy Drive	Stansberry Avenue	0.07	30.0	Very Poor	Mill and Replace AC	Rehabilitation	$47,060
Heiner Drive	Stansberry Avenue	Magma Avenue	0.25	37.0	Very Poor	Mill and Replace AC	Rehabilitation	$201,125
Hill Street	Terrace Drive	S. of Terrace Drive	0.03	40.0	Very Poor	Thin AC Overlay	Rehabilitation	$5,368
Porphyry Street	Magma Avenue	High School Avenue	0.05	30.0	Very Poor	Thin AC Overlay	Rehabilitation	$9,876
Quail Drive	Golf Course Road	Highlands Drive	0.14	55.0	Poor	Slurry Seal	Rehabilitation	$3,878
Ray Road	South Street	Gibbs Street	0.20	45.0	Poor	Thin AC Overlay	Rehabilitation	$27,965
Smock Avenue	Gorham Street	E. of Belmont Avenue	0.17	38.0	Very Poor	Slurry Seal	Rehabilitation	$11,677
South Avenue	Brown Street	Ray Street	0.04	30.0	Very Poor	Thin AC Overlay	Rehabilitation	$5,446
Terrace Drive	Stansberry Avenue	Hill Street	0.07	30.0	Very Poor	Thin AC Overlay	Rehabilitation	$10,136
Alley	Western Avenue	End	0.07	22.0	Serious	Mill and Replace AC	Rehabilitation	$30,160
Gomez Place	Sunset Drive	Sunset Drive	0.30	50.0	Poor	Sand Seal	Preventative	$15,837
Kumpke Ct	High School Avenue	End	0.09	10.0	Failed	Reconstruction	Rehabilitation	$115,814
Wight Street	Bridge Street	Church Avenue	0.15	8.0	Failed	Reconstruction	Rehabilitation	$186,518
		TOTAL	**5.24**					**$1,324,266**

Note: Average crack seal costs $2,200 per linear mile. Actual cost estimates may vary based on the amount of cracks.

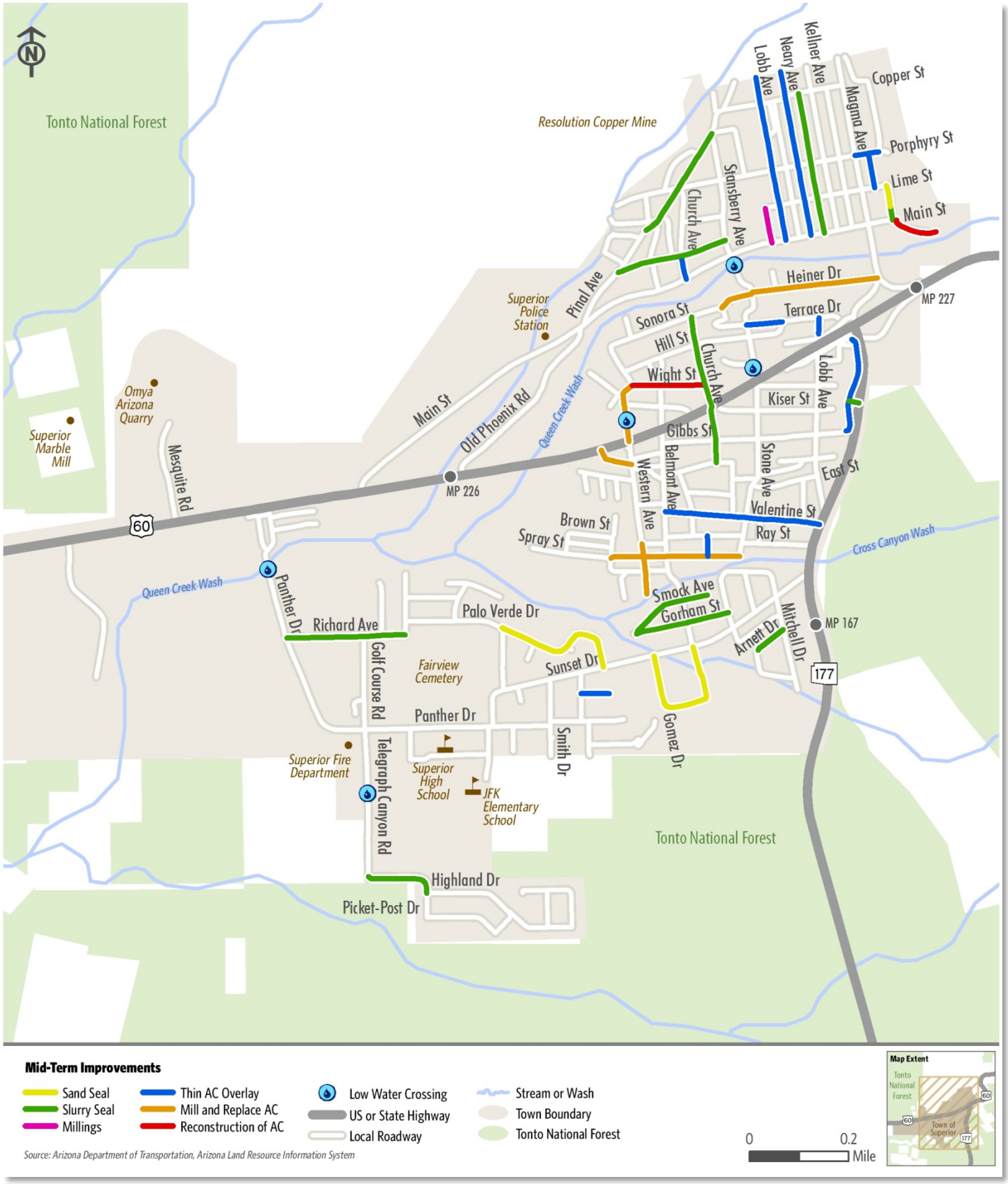
Summary of Mid-Term Recommended Treatments

Table 9.4 summarizes recommended treatments for the mid-term phase.

Table 9.4: Summary of Recommended Mid-Term Improvements

Recommended Treatment	Total Length	Estimated Cost
Preventative	**1.02**	**$68,906**
Sand Seal	0.61	$43,232
Slurry Seal	0.41	$25,674
Rehabilitation	**4.22**	**$ 1,255,360**
Mill and Replace AC	0.94	$548,260
Reconstruction	0.24	$302,332
Slurry Seal	1.49	$86,074
Thin AC Overlay	1.55	$318,694
TOTAL	**5.24**	**$ 1,324,266**

Figure 9.2: Recommended Mid-Term Improvements



RECOMMENDED LONG-TERM IMPROVEMENTS

Recommended long-term (2027-2036) pavement treatment options and their estimated costs are presented in Table 9.5. Table 9.6 summarizes the total mileage and cost for the long-term phase. Figure 9.3 provides an illustration of the recommended improvements for the long-term phase.

Table 9.5: Recommended Long-Term Improvements

Road Name	From	To	Length	PCI Value	PCI Rating	Recommended Treatment	Treatment Category	Cost
Church Avenue	Porphyry Street	Santa Rita Street	0.14	20.0	Serious	Thin AC Overlay	Rehabilitation	$18,141
Edna Avenue	Wilhoyt Street	End	0.04	20.0	Serious	Mill and Replace AC	Rehabilitation	$20,575
Edna Avenue	Brown Street	Spray Street	0.04	40.0	Very Poor	Thin AC Overlay	Rehabilitation	$8,206
High School Avenue	Magma Avenue	High School Avenue	0.07	38.0	Very Poor	Slurry Seal	Rehabilitation	$3,743
Hill Street	Bridge Street	Terrace Drive	0.35	20.0	Serious	Mill and Replace AC	Rehabilitation	$288,205
Hill Street	S. of Terrace Drive	End	0.08	40.0	Very Poor	Thin AC Overlay	Rehabilitation	$15,510
Hing Drive	Gray Drive	End	0.02	39.0	Very Poor	Thin AC Overlay	Rehabilitation	$3,718
Kellner Avenue	N. of Copper Street	Copper Street	0.29	12.0	Serious	Mill and Replace AC	Rehabilitation	$296,350
Lobb Avenue	Kiser Street	SR177	0.21	16.0	Serious	Mill and Replace AC	Rehabilitation	$141,110
Martin Street	Western Avenue	Belmont Avenue	0.04	12.0	Serious	Mill and Replace AC	Rehabilitation	$14,240
Mine Avenue	Copper Street	End	0.06	40.0	Very Poor	Thin AC Overlay	Rehabilitation	$8,976
Mitchell Drive	Sunset Drive	S. of Arnett Drive	0.19	56.0	Fair	Slurry Seal	Preventative	$10,149
Nunez Place	Sunset Drive	End	0.03	30.0	Very Poor	Thin AC Overlay	Rehabilitation	$7,208
Ocotillo Drive	W. of Frieda Ln	E. of Frieda Ln.	0.12	20.0	Serious	Thin AC Overlay	Rehabilitation	$24,986
Old Phoenix Road	S. of Main Street	US60	0.38	38.0	Very Poor	Thin AC Overlay	Rehabilitation	$45,189
Picket Post Drive	Quail Drive	Highlands Drive	0.19	68.0	Fair	Crack Seal	Preventative	$2,200
Porphyry Street	W. of Molina Street	Molina Street	0.03	12.0	Serious	Thin AC Overlay	Rehabilitation	$6,055
Porphyry Street	Molina Street	Pinal Avenue	0.07	12.0	Serious	Thin AC Overlay	Rehabilitation	$16,846
San Pedro Street	Santa Rita Street	End	0.08	20.0	Serious	Thin AC Overlay	Rehabilitation	$7,768
Spray Street	Spray Street	End	0.08	30.0	Very Poor	Thin AC Overlay	Rehabilitation	$16,971
Spray Street	Spray Street	Edna Avenue	0.09	38.0	Very Poor	Thin AC Overlay	Rehabilitation	$16,604

Note: Average crack seal costs $2,200 per linear mile. Actual cost estimates may vary based on the amount of cracks.

Table 9.5: Recommended Long-Term Improvements (Continued)

Road Name	From	To	Length	PCI Value	PCI Rating	Recommended Treatment	Treatment Category	Cost
Spray Street	Spray Street	Brown Street	0.04	30.0	Very Poor	Thin AC Overlay	Rehabilitation	$7,405
Starr Road	Western Avenue	End	0.08	33.0	Very Poor	Thin AC Overlay	Rehabilitation	$14,606
Wilhoyt Street	W. of Edna Avenue	Western Avenue	0.11	30.0	Very Poor	Slurry Seal	Rehabilitation	$7,325
Arnett Drive	W. of Mitchell Drive	Mitchell Drive	0.12	47.0	Poor	Thin AC Overlay	Rehabilitation	$23,394
Bridge Street	Sonora Street	Wight Street	0.10	50.0	Poor	Thin AC Overlay	Rehabilitation	$14,218
Christopher Avenue	Richard Avenue	End	0.11	54.0	Poor	Slurry Seal	Rehabilitation	$7,483
Copper Street	Mine Avenue	Lobb Avenue	0.07	80.0	Satisfactory	Sand Seal	Preventative	$4,220
Copper Street	Lobb Avenue	Magma Avenue	0.17	65.0	Fair	Sand Seal	Preventative	$14,301
Crowe Street	W. of Lobb Avenue	E. of Lobb Avenue	0.12	48.0	Poor	Thin AC Overlay	Rehabilitation	$18,288
Hing Drive	Sunset Drive	O'Donnell Drive	0.10	48.0	Poor	Thin AC Overlay	Rehabilitation	$19,594
Pinal Avenue	Copper Street	Stansberry Avenue	0.06	60.0	Fair	Slurry Seal	Preventative	$3,314
Quail Drive	Golf Course Rd	Highlands Drive	0.15	70.0	Fair	Sand Seal	Preventative	$4,223
San Juan Street	Pisano Street	Pinal Avenue	0.06	50.0	Poor	Slurry Seal	Rehabilitation	$2,733
Terrace Drive	Terrace Drive	E. of Hill Street	0.11	48.0	Poor	Thin AC Overlay	Rehabilitation	$21,458
Alley	Panther Drive	End	0.11	88.0	Good	Crack Seal	Preventative	$2,200
Heiner Drive	Church Avenue	Duffy Drive	0.06	30.0	Very Poor	Mill and Replace AC	Rehabilitation	$35,340
Kellner Avenue	Main Street	Copper Street	0.05	0.0	Failed	Mill and Replace AC	Rehabilitation	$31,205
Kiser Street	US60	Stone Avenue	0.10	20.0	Serious	Mill and Replace AC	Rehabilitation	$62,090
Kiser Street	Stone Avenue	E. of Lobb Avenue	0.16	36.0	Very Poor	Thin AC Overlay	Rehabilitation	$31,573
Magma Alley	Copper Street	Main Street	0.29	22.0	Serious	Mill and Replace AC	Rehabilitation	$109,385
Medlock Drive	South Avenue	Sunset DR	0.08	10.0	Failed	Reconstruction	Rehabilitation	$80,113
Palma Street	US60	Panther Drive	0.11	70.0	Fair	Slurry Seal	Rehabilitation	$7,249
Palo Fierro Place	Palo Verde Drive	End	0.04	10.0	Failed	Reconstruction	Rehabilitation	$57,192
Saguaro Drive	Palo Verde Drive	Sunset Drive	0.13	23.0	Serious	Thin AC Overlay	Rehabilitation	$34,678

Note: Average crack seal costs $2,200 per linear mile. Actual cost estimates may vary based on the amount of cracks.

Table 9.5: Recommended Long-Term Improvements (Continued)

Road Name	From	To	Length	PCI Value	PCI Rating	Recommended Treatment	Treatment Category	Cost
Smith Drive	Sunset Drive	O'Donnell Drive	0.09	59.0	Fair	Sand Seal	Preventative	$7,529
South Avenue	Sunset Drive	Sunset Drive	0.25	21.0	Serious	Mill and Replace AC	Rehabilitation	$147,880
Valentine Street	Western Avenue	Belmont Avenue	0.06	20.0	Serious	Mill and Replace AC	Rehabilitation	$42,620
Walker Way	Copper Street	Main Street	0.28	5.0	Failed	Mill and Replace AC	Rehabilitation	$106,615
Copper Street	High School Avenue	High School Avenue	0.02	54.0	Poor	Slurry Seal	Rehabilitation	$1,820
Crowe Street	Belmont Avenue	Church Avenue	0.14	41.0	Poor	Thin AC Overlay	Rehabilitation	$24,884
Empalme Street	Pinal Avenue	Santa Rita Street	0.08	48.0	Poor	Slurry Seal	Rehabilitation	$4,739
Empalme Street	Santa Rita Street	Main Street	0.06	50.0	Poor	Slurry Seal	Rehabilitation	$1,670
Frieda Ln	Ocotillo Drive	Marion Ln	0.04	48.0	Poor	Slurry Seal	Rehabilitation	$2,921
Frieda Ln	Marion Drive	Palo Verde Drive	0.05	54.0	Poor	Slurry Seal	Rehabilitation	$3,137
Garrott Avenue	Silver Street	Porphyry Street	0.10	54.0	Poor	Slurry Seal	Rehabilitation	$7,344
Gray Drive	Hing Drive	End	0.10	45.0	Poor	Slurry Seal	Rehabilitation	$7,757
Hing Drive	Smith Drive	Gray Drive	0.05	48.0	Poor	Thin AC Overlay	Rehabilitation	$10,913
Pisano Street	San Juan Street	Pinal Avenue	0.08	54.0	Poor	Slurry Seal	Rehabilitation	$2,433
Porphyry Street	High School Avenue	End	0.02	48.0	Poor	Thin AC Overlay	Rehabilitation	$3,219
Silver Street	Pinal Avenue	Garrott Avenue	0.05	48.0	Poor	Slurry Seal	Rehabilitation	$2,340
Simpson Street	Western Avenue	Belmont Avenue	0.07	54.0	Poor	Slurry Seal	Rehabilitation	$2,796
Stansberry Avenue	Pinal Avenue	Porphyry Street	0.10	50.0	Poor	Slurry Seal	Rehabilitation	$6,733
Airport Rd	US60	Wastewater Treatment Plant	0.30	18.0	Serious	Pave dirt road	New Pavement	$524,638
Brown Street	Western Avenue	Belmont Avenue	0.05	20.0	Serious	Mill and Replace AC	Rehabilitation	$37,940
Bush Drive	W. of Thompson Drive	Highlands Drive	0.17	99.0	Good	Crack Seal	Preventative	$2,200
Center Avenue	Crowe Street	Brown Street	0.13	22.0	Serious	Mill and Replace AC	Rehabilitation	$71,675
Contreras Street	East Street	Valentine Street	0.09	84.0	Satisfactory	Slurry Seal	Rehabilitation	$4,640
East Street	Stone Avenue	Lobb Avenue	0.14	70.0	Fair	Slurry Seal	Preventative	$7,618

Note: Average crack seal costs $2,200 per linear mile. Actual cost estimates may vary based on the amount of cracks.

Table 9.5: Recommended Long-Term Improvements (Continued)

Road Name	From	To	Length	PCI Value	PCI Rating	Recommended Treatment	Treatment Category	Cost
High School Avenue	High School Avenue	High School Avenue	0.05	12.0	Serious	Mill and Replace AC	Rehabilitation	$60,010
Kiser Street	Western Avenue	US60	0.14	34.0	Very Poor	Thin AC Overlay	Rehabilitation	$27,720
Magma Flats Street	Panther Drive	End	0.09	71.0	Satisfactory	Sand Seal	Preventative	$5,418
Marion Drive	Richard Avenue	Frieda Ln	0.11	65.0	Fair	Sand Seal	Preventative	$6,931
Moffatt Street	Stone Avenue	Crowe Street	0.10	70.0	Fair	Crack Seal	Preventative	$2,200
Molina Street	Porphyry Street	Pinal Avenue	0.07	20.0	Serious	Mill and Replace AC	Rehabilitation	$39,795
Quail Drive	Highlands Drive	Picket Post Drive	0.05	91.0	Good	Crack Seal	Preventative	$2,200
Thompson Drive	Cherrywood Place	Highlands Drive	0.08	97.0	Good	Crack Seal	Preventative	$2,200
Unnamed Rd	Sonora Street	End	0.04	12.0	Serious	Reconstruction	Rehabilitation	$44,866
Lime Street	W. of Molina Street	Pinal Avenue	0.17	54.0	Poor	Thin AC Overlay	Rehabilitation	$25,411
Brown Street	Belmont Avenue	Stone Avenue	0.15	20.0	Serious	Mill and Replace AC	Rehabilitation	$114,545
Carney Street	US60	Panther Drive	0.09	70.0	Fair	Thin AC Overlay	Rehabilitation	$11,553
Church Avenue	Crowe Street	Valentine Street	0.11	70.0	Fair	Sand Seal	Preventative	$4,793
Duffy Drive	Sonora Street	Stansberry Avenue	0.11	80.0	Satisfactory	Crack Seal	Preventative	$2,200
High School Avenue	High School Avenue	Porphyry Street	0.09	63.0	Fair	Sand Seal	Rehabilitation	$7,593
Lime Street	Church Avenue	Stansberry Avenue	0.08	56.0	Fair	Slurry Seal	Preventative	$3,821
Lobb Avenue	South Street	Kiser Street	0.11	70.0	Fair	Slurry Seal	Preventative	$5,547
Moffatt Street	Church Avenue	Stone Avenue	0.05	80.0	Satisfactory	Crack Seal	Preventative	$2,200
O'Donnell Drive	Smith Drive	E. of Hing Drive	0.15	27.0	Very Poor	Mill and Replace AC	Rehabilitation	$142,420
Pinal Avenue	N. of Copper Street	Copper Street	0.05	86.0	Good	Crack Seal	Preventative	$2,200
Ray Street	Stone Avenue	SR177	0.14	25.0	Serious	Mill and Replace AC	Rehabilitation	$140,960
San Pedro Street	Empalme Street	E. of Empalme Street	0.02	56.0	Fair	Slurry Seal	Preventative	$1,266
Smith Drive	Panther Drive	End	0.16	6.0	Failed	Reconstruction	Rehabilitation	$131,723
Sonora Street	Bridge Street	Church Avenue	0.17	38.0	Very Poor	Mill and Replace AC	Rehabilitation	$139,540

Note: Average crack seal costs $2,200 per linear mile. Actual cost estimates may vary based on the amount of cracks.

Table 9.5: Recommended Long-Term Improvements (Continued)

Road Name	From	To	Length	PCI Value	PCI Rating	Recommended Treatment	Treatment Category	Cost
South Street	Lobb Avenue	End	0.07	95.0	Good	Crack Seal	Rehabilitation	$2,200
South Street	Lobb Avenue	Ray Rd	0.08	78.0	Satisfactory	Crack Seal	Rehabilitation	$2,200
Airport Rd	Wastewater Treatment Plant	End	0.12	18.0	Serious	Pave dirt road	New Pavement	$152,914
Brown Street	Spray Street	Edna Avenue	0.09	10.0	Failed	Reconstruction	Rehabilitation	$115,854
Rainbow Street	Pinal Avenue	Porphyry Street	0.12	10.0	Failed	Reconstruction	Rehabilitation	$108,306
Wight Street	Stone Avenue	E. of Lobb Avenue	0.16	20.0	Serious	Mill and Replace AC	Rehabilitation	$107,025
		TOTAL	**10.67**					**$4,038,009**

Note: Average crack seal costs $2,200 per linear mile. Actual cost estimates may vary based on the amount of cracks.

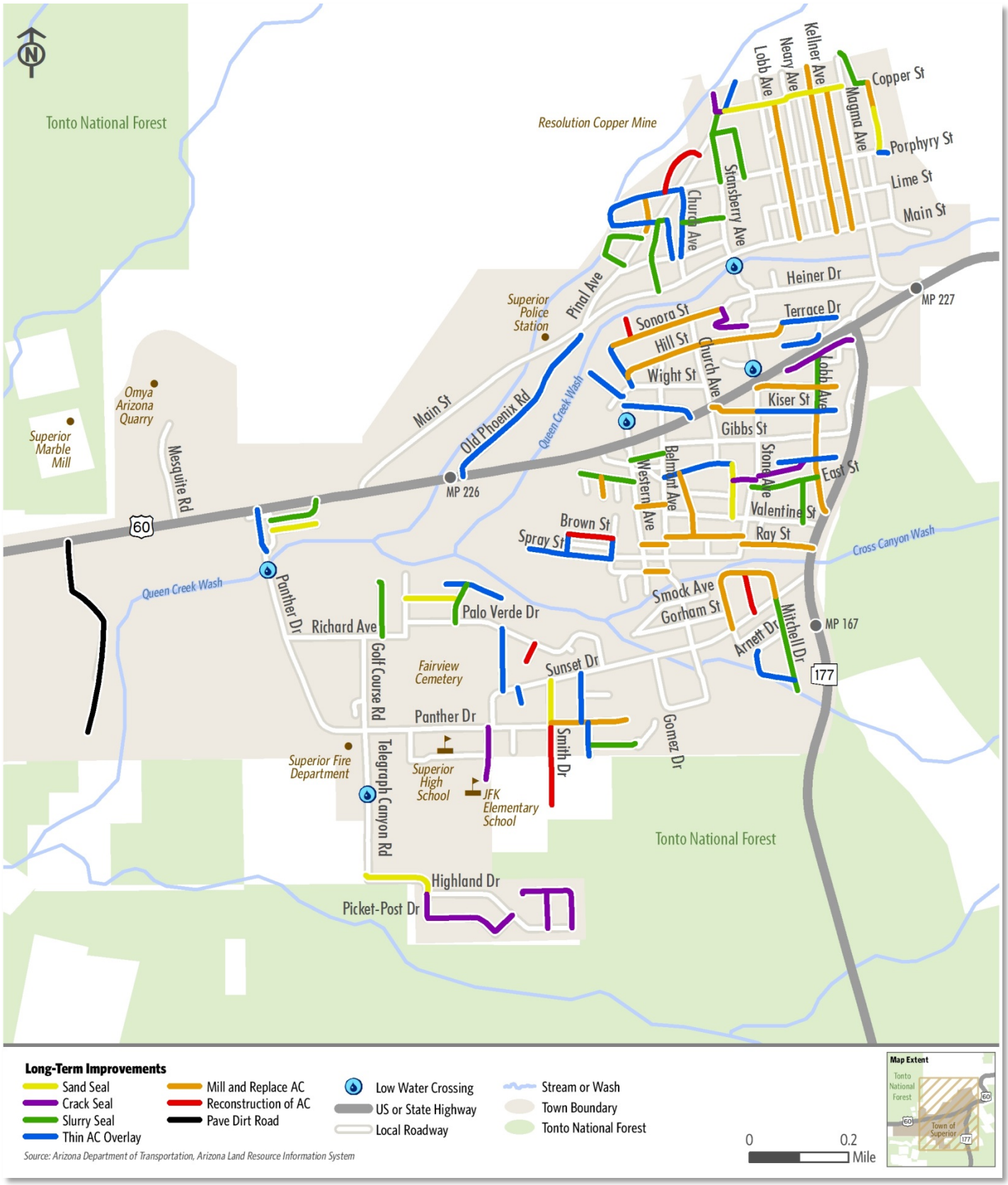
Summary of Long-Term Recommended Treatments

Table 9.6 summarizes recommended treatments for the long-term phase.

Table 9.6: Summary of Recommended Long-Term Improvements

Recommended Treatment	Total Length	Estimated Cost
New Pavement	**0.42**	**$677,552**
Pave Dirt Road	0.42	$677,552
Preventative	**2.3**	**$98,930**
Crack Seal	0.91	$19,800
Sand Seal	0.79	$47,415
Slurry Seal	0.6	$31,715
Rehabilitation	**7.95**	**$3,261,527**
Crack Seal	0.15	$4,400
Mill and Replace AC	3.09	$2,149,525
Reconstruction	0.53	$538,054
Sand Seal	0.09	$7,593
Slurry Seal	1.3	$76,863
Thin AC Overlay	2.79	$48,5092
TOTAL	**10.67**	**$4,038,009**

Figure 9.3: Recommended Long-Term Improvements

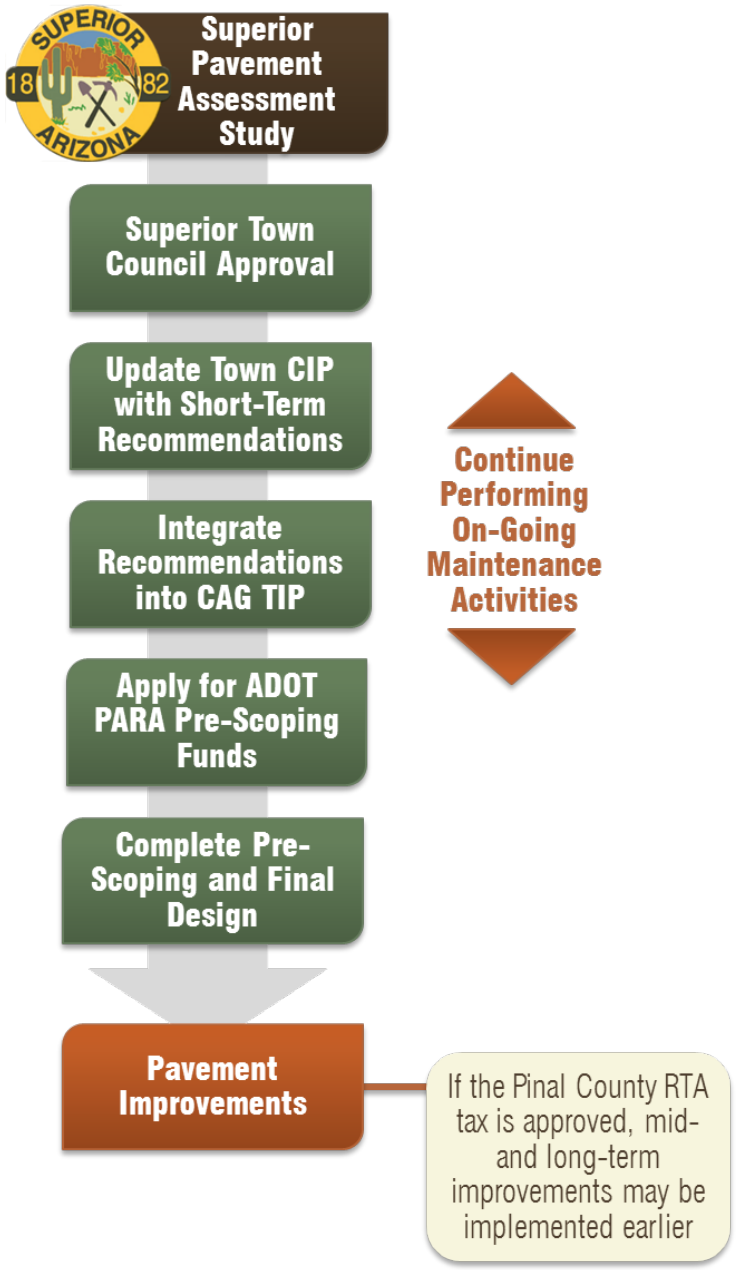


IMPLEMENTATION STRATEGIES

This study serves as the first step in the project development process. Implementation of the recommended Maintenance and Repair Plan requires active participation from local citizens, private entities; and local, county, and State government officials. The following actions are recommended to successfully implement recommendations from this study and are illustrated in Figure 9.4:

- Present the *Superior Pavement Assessment Study* to the Superior Town Council for approval of recommendations.
- Integrate the high priority short-term projects into the next update of the Town of Superior Capital Improvement Program (CIP) as available funding allows.
- Integrate short-term priority improvements into the CAG Transportation Improvement Program (TIP).
- Apply for pre-scoping funds through the ADOT Planning Assistance for Rural Area (PARA) program.
- Complete pre-scoping and final design phases of the project development process.
- Incorporate recommendations into existing and future planning documents.
- Solicit grants for bicycle and pedestrian improvements to construct new pedestrian and bicycle facilities in deficient locations and to connect activity centers.

Figure 9.4: Recommended Implementation Steps



APPENDIX A
SAMPLE UNITS PAVEMENT CONDITION INDEX

Figure A-1: Sample Unit Pavement Conditions

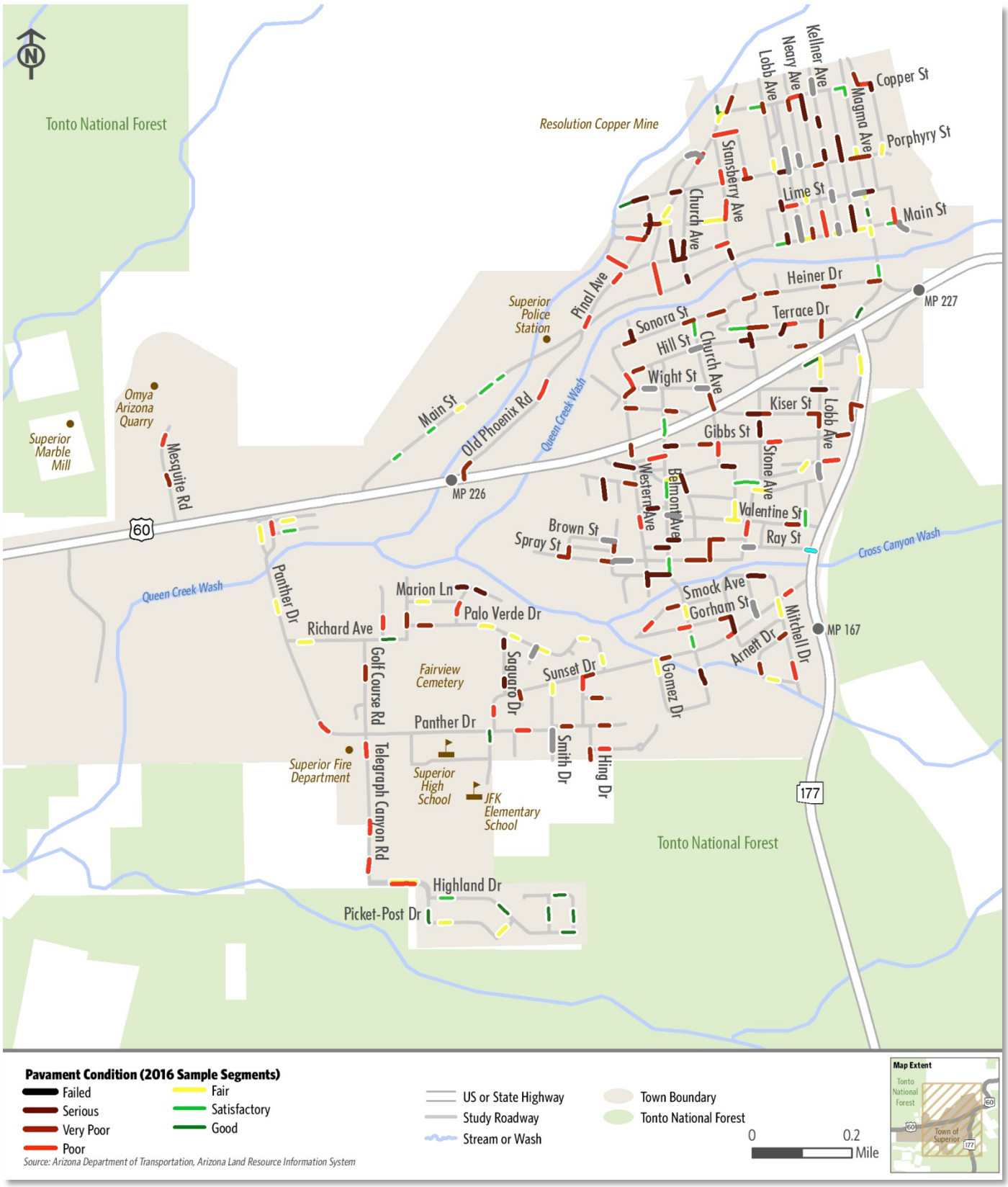


Table A-1: Sample Unit Location and Pavement Condition Index

Sample Unit ID	Street Name	Description	PCI
R10-S1-SS1	Richard Avenue	North of Palo Verde Drive	30
R100-S1-SS1	Contreras Street	North of Valentine Street	84
R101-S1-SS1	Ray Street	West of SR-177	40
R101-S1-SS2	Ray Street	East of Stone Avenue	8
R102-S1-SS1	Lobb Avenue	South of South Street	70
R102-S2-SS1	Lobb Avenue	South of Kiser Street	26
R102-S2-SS2	Lobb Avenue	North of East Street	4
R103-S1-SS1	Ray Rd	South of South Street	60
R103-S1-SS2	Gibbs Street	South of Ray Rd	30
R104-S1-SS1	Ray Rd	West of SR-177	30
R107-S1-SS1	Magma Avenue	North of Porphyry Street	60
R107-S1-SS2	Magma Avenue	South of Lime Street	60
R107-S1-SS3	Magma Avenue	South of Copper Street	76
R107-S1-SS4	Magma Avenue	North of Main Street	87
R107-S2-SS1	Magma Avenue	South of Main Street	70
R107-S3-SS1	Magma Avenue	North of US-60	100
R107-S3-SS2	Magma Avenue	North of Heiner Drive	80
R109-S1-SS2	Main Street	0.1 miles North of US-60	76
R109-S1-SS3	Main Street	0.2 miles North of US-60	76
R109-S1-SS4	Main Street	0.26 miles North of US-60	70
R109-S1-SS5	Main Street	0.32 miles North of US-60	80
R109-S1-SS6	Main Street	0.33 miles North of US-60	80
R109-S1-SS7	Main Street	0.36 miles North of US-60	80
R109-S2-SS1	Main Street	West of Lobb Avenue	80
R109-S3-SS1	Main Street	West of Neary Avenue	70
R109-S3-SS2	Main Street	West of Kellner Avenue	56
R109-S3-SS3	Main Street	West of Magma Avenue	65
R109-S3-SS4	Main Street	West of High School Avenue	83
R11-S1-SS1	Marion Lane	East of Richard Avenue	65
R110-S1-SS1	Old Phoenix Rd	North of US-60	30
R110-S1-SS2	Old Phoenix Rd	North of US-60	45
R111-S1-SS1	Pinal Avenue	North of Main Street	54

Table A-1: Sample Unit Location and Pavement Condition Index (Continued)

Sample Unit ID	Street Name	Description	PCI
R111-S1-SS2	Pinal Avenue	South of Santa Rita Street	52
R111-S2-SS1	Pinal Avenue	North of San Juan Street	40
R111-S3-SS1	Pinal Avenue	North of San Pedro Street	70
R111-S3-SS2	Pinal Avenue	South of Rainbow Street	50
R111-S4-SS3	Pinal Avenue	South of Copper Street	60
R112-S1-SS1	San Juan Street	West of Pinal Avenue	50
R113-S1-SS1	Pisano Street	West of Pinal Avenue	54
R114-S1-SS1	Molina Street	North of Pinal Avenue	20
R115-S1-SS1	Porphyry Street	West of Pinal Avenue	30
R115-S1-SS2	Porphyry Street	West of Molina Avenue	88
R115-S2-SS1	Porphyry Street	West of Molina Avenue	12
R115-S3-SS1	Porphyry Street	West of Pinal Avenue	12
R115-S4-SS1	Porphyry Street	West of Magma Avenue	30
R115-S4-SS2	Porphyry Street	West of Kellner Avenue	26
R115-S4-SS3	Porphyry Street	East of Lobb Avenue	22
R115-S4-SS4	Porphyry Street	East of Garrott Avenue	30
R115-S5-SS1	Porphyry Street	East of Magma Avenue	30
R116-S1-SS1	Rainbow Street	West of Pinal Avenue	10
R117-S1-SS1	San Pedro Street	East of Pinal Avenue	56
R118-S1-SS1	San Pedro Street	North of Santa Rita Street	20
R119-S2-SS1	Empalme Street	North of Main Street	50
R12-S1-SS1	Ocotillo Drive	East of Frieda Lane	20
R12-S1-SS2	Ocotillo Drive	West of Frieda Lane	20
R120-S1-SS1	Church Avenue	North of Santa Rita Street	20
R120-S2-SS1	Church Avenue	North of Main Street	16
R121-S1-SS1	Lime Street	West of Stansberry Avenue	56
R122-S1-SS1	Santa Rita Street	West of Stansberry Avenue	50
R122-S1-SS2	Santa Rita Street	West of Church Avenue	18
R123-S1-SS1	Garrott Avenue	North of Porphyry Street	54
R124-S1-SS1	Silver Street	East of Pinal Avenue	48
R126-S1-SS1	Lime Street	West of Magma Avenue	4
R126-S1-SS2	Lime Street	East of Lobb Avenue	50

Table A-1: Sample Unit Location and Pavement Condition Index (Continued)

Sample Unit ID	Street Name	Description	PCI
R126-S2-SS1	Lime Street	East of Magma Avenue	20
R127-S1-SS1	Lobb Avenue	North of Main Street	16
R127-S1-SS2	Lobb Avenue	North of Lime Street	18
R127-S1-SS3	Lobb Avenue	North of Porphyry Street	60
R127-S1-SS4	Lobb Avenue	South of Copper Street	26
R128-S1-SS1	Walker Way	North of Main Street	5
R128-S1-SS2	Walker Way	North of Porphyry Street	5
R129-S1-SS1	Neary Avenue	North of Main Street	38
R129-S1-SS2	Neary Avenue	North of Lime Street	64
R129-S1-SS3	Neary Avenue	North of Porphyry Street	10
R129-S1-SS4	Neary Avenue	South of Copper Street	38
R13-S2-SS1	Frieda Lane	North of Palo Verde Drive	54
R130-S1-SS1	Alley	South of Copper Street	22
R130-S1-SS2	Alley	North of Main Street	55
R131-S1-SS1	Kellner Avenue	North of Cooper Street	0
R131-S2-SS1	Kellner Avenue	North of Main Street	10
R131-S2-SS2	Kellner Avenue	North of Lime Street	10
R131-S2-SS3	Kellner Avenue	North of Porphyry Street	12
R131-S2-SS4	Kellner Avenue	South of Copper Street	20
R132-S1-SS1	Magma Alley	North of Main Street	22
R132-S1-SS2	Magma Alley	North of Porphyry Street	22
R134-S2-SS1	High School Avenue	North of Main Street	41
R135-S1-SS1	Kumpke Court	South of Main Street	10
R136-S1-SS1	Stansberry Avenue	North of Porphyry Street	50
R136-S2-SS1	Stansberry Avenue	North of Lime Street	50
R136-S4-SS2	Stansberry Avenue	North of Main Street	12
R137-S1-SS1	Pinal Avenue	North of Copper Street	86
R138-S1-SS1	Mine Avenue	North of Copper Street	40
R14-S1-SS1	Palo Verde Drive	East of Richard Avenue	38
R14-S1-SS2	Palo Verde Drive	East of Frieda Lane	70
R14-S2-SS1	Palo Verde Drive	North of Sunset Drive	64
R14-S2-SS2	Palo Verde Drive	North of Sunset Drive	70

Table A-1: Sample Unit Location and Pavement Condition Index (Continued)

Sample Unit ID	Street Name	Description	PCI
R14-S2-SS3	Palo Verde Drive	East of Palo Fierro Place	70
R14-S2-SS4	Palo Verde Drive	East of Saguaro Drive	70
R140-S1-SS1	Copper Street	West of Lobb Avenue	80
R140-S2-SS1	Copper Street	West of Magma Avenue	80
R140-S2-SS2	Copper Street	East of Neary Avenue	50
R141-S1-SS1	High School Avenue	North of Copper Street	38
R142-S1-SS1	Copper Street	West of High School Avenue	54
R143-S1-SS1	High School Avenue	South of Copper Street	12
R143-S2-SS1	High School Avenue	North of Porphyry Street	63
R15-S1-SS1	Saguaro Drive	North of Sunset Drive	20
R15-S1-SS2	Saguaro Drive	South of Palo Verde Drive	25
R16-S1-SS1	Golf Course Rd	North of Quail Drive	52
R16-S1-SS2	Golf Course Rd	0.1 miles North of Quail Drive	54
R16-S1-SS3	Golf Course Rd	South of Panther Drive	53
R16-S1-SS4	Golf Course Rd	South of Richard Avenue	40
R18-S1-SS1	Quail Drive	East of Golf Course Rd	70
R19-S1-SS1	Quail Drive	East of Golf Course Rd	55
R2-S1-SS1	Mesquite Rd	North of US-60	48.5
R2-S1-SS2	Mesquite Rd	North of US-60	30
R20-S1-SS1	Highlands Drive	West of Cherrywood Place	100
R20-S1-SS2	Highlands Drive	West of Picket-post Drive	91
R20-S1-SS3	Highlands Drive	East of Quail Drive	80
R21-S1-SS1	Picket-post Drive	South of Highlands Drive	66
R21-S1-SS2	Picket Post Drive	East of Quail Drive	70
R22-S1-SS1	Quail Drive	North of Picket Post Drive	91
R23-S1-SS1	Thompson Drive	North of Highlands Drive	97
R24-S1-SS1	Bush Drive	North of Highlands Drive	100
R24-S1-SS2	Cherrywood Place	East of Thompson Drive	98
R25-S1-SS1	Palo Fierro Place	South of Palo Verde Drive	10
R27-S1-SS1	Sunset Drive	East of Mitchell Drive	55
R27-S1-SS2	Sunset Drive	West of South Avenue	50
R27-S1-SS3	Sunset Drive	East of Gomez Place	38

Table A-1: Sample Unit Location and Pavement Condition Index (Continued)

Sample Unit ID	Street Name	Description	PCI
R27-S1-SS4	Sunset Drive	East of Hing Drive	30
R27-S1-SS6	Sunset Drive	North of Panther Drive	54
R28-S1-SS1	Nunez Place	South of Sunset Drive	30
R3-S1-SS1	Panther Drive	South of Palma Street	50
R3-S1-SS2	Panther Drive	North of Richard Avenue	60
R3-S1-SS3	Panther Drive	West of Golf Course Rd	42
R3-S1-SS4	Panther Drive	East of Sunset Drive	50
R31-S1-SS1	Sunset Drive	South of Panther Drive	88
R33-S1-SS1	Smith Drive	South of Sunset Drive	59
R33-S2-SS1	Smith Drive	South of O'Donnell Drive	6
R34-S1-SS1	O'Donnell Drive	East of Hing Drive	26
R34-S1-SS2	O'Donnell Drive	East of Smith Drive	28
R35-S2-SS1	Hing Drive	South of Gray Drive	39
R36-S1-SS1	Gray Drive	East of Hing Drive	45
R37-S1-SS1	Hing Drive	South of Sunset Drive	48
R38-S1-SS1	Harrington Place	East of Hing Drive	30
R39-S1-SS1	Gomez Place	South of Sunset Drive	70
R39-S1-SS3	Gomez Place	South of Belmont Avenue	20
R41-S1-SS1	Mitchell Drive	South of Sunset Drive	70
R41-S1-SS2	Mitchell Drive	North of Arnett Drive	42
R43-S1-SS1	Arnett Drive	West of Mitchell Drive	30
R43-S2-SS1	Arnett Drive	West of Mitchell Drive	40
R43-S2-SS2	Arnett Drive	West of Mitchell Drive	56
R44-S1-SS1	Medlock Drive	North of Sunset Drive	10
R45-S1-SS1	South Avenue	North of Sunset Drive	22
R45-S1-SS2	Mitchell Drive	North of Sunset Drive	20
R46-S2-SS1	Gorham Street	West of South Avenue	40
R46-S2-SS2	Gorham Street	West of Belmont Avenue	50
R47-S1-SS1	Smock Avenue	West of Belmont Avenue	26
R47-S1-SS2	Smock Avenue	North of Gorham Street	50
R48-S1-SS1	Belmont Avenue	North of US60	80
R48-S1-SS2	Belmont Avenue	South of Crowe Street	82

Table A-1: Sample Unit Location and Pavement Condition Index (Continued)

Sample Unit ID	Street Name	Description	PCI
R48-S1-SS3	Belmont Avenue	North of Martin Street	80
R48-S2-SS1	Belmont Avenue	North of Sunset Drive	80
R48-S2-SS2	Belmont Avenue	South of Smock Avenue	70
R49-S1-SS1	Western Avenue	West of Wight Street	30
R49-S2-SS1	Western Avenue	South of US60	26
R49-S2-SS2	Western Avenue	South of Valentine Street	50
R49-S3-SS1	Western Avenue	South of Martin Street	20
R5-S1-SS1	Carney Street	North of Panther Drive	70
R50-S1-SS1	Spray Street	West of Brown Street	30
R50-S2-SS1	Spray Street	West of Edna Avenue	38
R50-S3-SS1	Ray Street	West of South Avenue	30
R50-S3-SS2	Ray Street	East of Edna Avenue	0
R52-S1-SS1	Martin Street	East of Western Avenue	12
R53-S2-SS1	Edna Avenue	South of Brown Street	40
R54-S1-SS1	Brown Street	North of Spray Street	30
R56-S1-SS1	Brown Street	West of Edna Avenue	10
R57-S1-SS1	Wilhoyt Street	West of Western Avenue	30
R59-S1-SS1	Edna Avenue	South of Wilhoyt Street	20
R6-S1-SS1	Palma Street	East of Panther Drive	70
R61-S1-SS1	Unnamed Rd	West of Western Avenue	22
R64-S1-SS1	Kiser Street	East of Western Avenue	30
R64-S1-SS2	Kiser Street	East of Belmont Avenue	38
R65-S1-SS1	Simpson Street	West of Belmont Avenue	54
R67-S1-SS1	Valentine Street	West of Belmont Avenue	20
R68-S1-SS1	Brown Street	West of Belmont Avenue	20
R69-S1-SS1	Wight Street	West of Church Avenue	10
R69-S1-SS2	Wight Street	West of Belmont Avenue	6
R7-S1-SS1	Magma Flats Street	East of Panther Drive	71
R70-S1-SS1	Gibbs Street	East of Lobb Avenue	40
R70-S1-SS2	Gibbs Street	East of Stone Avenue	48
R70-S1-SS3	Gibbs Street	West of Church Avenue	30
R70-S1-SS4	Gibbs Street	East of Belmont Avenue	14

Table A-1: Sample Unit Location and Pavement Condition Index (Continued)

Sample Unit ID	Street Name	Description	PCI
R71-S1-SS1	Crowe Street	West of Church Avenue	22
R71-S1-SS2	Crowe Street	East of Belmont Avenue	56
R72-S1-SS1	Church Avenue	North of Valentine Street	70
R74-S1-SS1	Valentine Street	West of Contreras Street	32
R74-S1-SS2	Valentine Street	South of Church Avenue	70
R74-S1-SS3	Valentine Street	East of Belmont Avenue	10
R75-S1-SS1	Center Avenue	South of Crowe Street	22
R76-S1-SS1	Brown Street	East of South Avenue	30
R76-S1-SS2	Brown Street	East of Belmont Avenue	12
R77-S1-SS1	South Avenue	South of Brown Street	30
R78-S1-SS1	Church Avenue	South of Sonora Street	80
R78-S1-SS2	Church Avenue	North of US60	38
R78-S2-SS1	Church Avenue	South of Gibbs Street	50
R79-S1-SS1	Bridge Street	North of Wight Street	50
R8-S1-SS1	Richard Avenue	East of Panther Drive	64
R8-S1-SS2	Richard Avenue	East of Christopher Avenue	90
R80-S1-SS1	Unnamed Rd	North of Sonora Street	12
R82-S1-SS1	Hill Street	South of Terrace Drive	20
R82-S1-SS2	Hill Street	West of Stone Avenue	20
R82-S1-SS3	Hill Street	West of Church Avenue	10
R82-S1-SS4	Hill Street	East of Bridge Street	30
R84-S1-SS1	Kiser Street	West of Stone Avenue	20
R84-S2-SS1	Kiser Street	Lobb Avenue	40
R84-S2-SS2	Kiser Street	East of Stone Avenue	32
R85-S1-SS1	Moffatt Street	West of Church Avenue	80
R85-S2-SS1	Moffatt Street	South of Crowe Street	70
R86-S1-SS2	Stone Avenue	South of Terrace Drive	12
R86-S1-SS3	Stone Avenue	South of Kiser Street	22
R86-S1-SS4	Stone Avenue	South of Valentine Street	50
R87-S1-SS1	Sonora Street	West of Church Avenue	40
R87-S1-SS2	Sonora Street	East of Bridge Street	36
R87-S2-SS1	Sonora Street	West of Duffy Drive	30

Table A-1: Sample Unit Location and Pavement Condition Index (Continued)

Sample Unit ID	Street Name	Description	PCI
R88-S1-SS1	Sonora Street	West of Stone Avenue	30
R88-S2-SS1	Heiner Drive	West of Magma Avenue	40
R88-S2-SS2	Heiner Drive	0.1mi West of Magma Avenue	40
R88-S2-SS3	Heiner Drive	East of Stone Avenue	30
R9-S1-SS1	Christopher Avenue	North of Richard Avenue	54
R90-S1-SS1	Terrace Drive	West of Stone Avenue	80
R91-S1-SS1	Terrace Drive	East of Stone Avenue	30
R91-S2-SS1	Terrace Drive	East of Hill Street	48
R92-S1-SS1	Hill Street	South of Terrace Drive	40
R92-S2-SS1	Hill Street	0.1 South of Terrace Drive	40
R95-S1-SS1	South Street	West of Lobb Avenue	94.5
R96-S1-SS1	Wight Street	West of Lobb Avenue	20
R97-S1-SS1	Crowe Street	East of Lobb Avenue	48
R98-S1-SS1	East Street	East of Stone Avenue	70