Committee Members
Councilmember Chris Moore
Councilmember John Williams
City Administrator Scott Larson
City Clerk Kim Agfalvi
Executive Asst. Danielle Charchenko
Capital Projects Manager John Bielka
Finance Director Gretchen Russo
Engineer JC Hungerford
Admin Asst. Laura Hinds
Records Organizer Alison Williams
Building Official Tim Lincoln

City of Orting Public Works Committee
AGENDA

Wednesday, July 5, 2023 – 2:30 p.m.
Public Works Operations Facility, Conference Rm, 900 Rocky Rd NE

- Call Meeting to Order, Roll Call
- Approval of Minutes
- Public Comment & Presentations

DEPARTMENT REPORTS	**Est. Time**	**Action**
1. ENGINEERING Updates– JC Hungerford **1.1** Scada Presentation **1.2** Kansas Street Reconstruction – Status report. **1.3** Whitehawk Blvd bypass – Status report **1.4** WSDOT Fish Passage – Utility Crossing **1.5** AC Watermain Design – Status report **1.6** Village Green Outfall – Status report **1.7** Pedestrian Bridge Update 1.7.1 WSDOT Construction Agreement 1.7.2 RFP results July 12th	Min 15	
2. PROJECT MANAGEMENT – John Bielka **2.1** Well Updates **2.2** Pavement Management Report **2.3** ADA Update **2.4** Grant Updates **NEW BUSINESS** **2.5** SCADA Upgrade Proposals **2.6** WRRF RFQ Proposal **2.7** I&I Sewer Relining Update **2.8** Site Security @ Sources Update **2.9** Draft Items for Budget CIP	Min 15	
3. PUBLIC WORKS – Daskam **3.1** Dump Truck Purchase	2	

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City of Orting Public Works Committee
AGENDA

5 FINANCE – Gretchen Russo 5.1 Budget Season	Min	

6. COUNCIL – CM Williams & CM Moore	Min	

REQUEST FOR NEW BUSINESS

-

ROUND TABLE

-

MEETING SUMMARY

ADJOURN

City of Orting Public Works Committee Agenda Request
For Meeting of July 5, 2023

PUBLIC WORKS AGENDA REPORT REQUEST

Old Business DEPARTMENT: Engineering & Project Management

Topic	Summary	Time Needed
SCADA Presentation		15

Topic	Summary	Time Needed
Kansas St Reconstruction	Update	3

Topic	Summary	Time Needed
Whitehawk Blvd Bypass	Status Report	3

Topic	Summary	Time Needed
WSDOT Fish Passage		

Topic	Summary	Time Needed
AC Watermain Design	Status Report	

Topic	Summary	Time Needed
Village Green Outfall	Status Report	

Topic	Summary	Time Needed
Pedestrian Bridge Update	Update	

Topic	Summary	Time Needed
Well	Updates	

Topic	Summary	Time Needed
Pavement Management Plant	Report Attached	

City of Orting Public Works Committee Agenda Request
For Meeting of July 5, 2023

Topic	Summary	Time Needed
ADA Update		

Topic	Summary	Time Needed
Grant Updates		

Topic	Summary	Time Needed
SCADA Upgrade Proposals	See Attachment	

Topic	Summary	Time Needed
WRRF	RFQ Proposal Attached	

Topic	Summary	Time Needed
I&I Sewer Relining	Status Report	

Topic	Summary	Time Needed
Site Security @ Sources	Update	

Topic	Summary	Time Needed
Draft Items for Budget	Attachment will be provided at meeting	

City of Orting Public Works Committee Agenda Request
For Meeting of July 5, 2023

PUBLIC WORKS AGENDA REPORT REQUEST

Old Business DEPARTMENT: Public Works

Topic	Summary	Time Needed
Dump Truck	Purchase	3

Topic	Summary	Time Needed
Sidewalk Grinding	Update	

Topic	Summary	Time Needed

New Business:

Topic	Summary	Time Needed
Sidewalk RFP	Will Update in August	

Topic	Summary	Time Needed

Topic	Summary	Time Needed

2023 Pavement Management System (PMS)

ORTING
Washington

June 2023

SCJ ALLIANCE
CONSULTING SERVICES

2023 Pavement Management System

Project Information

Project:	2023 Pavement Management System (PMS)
Prepared for:	City of Orting P.O. Box 489 Orting, WA 98360 Contact Name: John Bielka Contact Phone: 360.706.7206

Project Representative

Prepared by:	SCJ Alliance 1201 Third Avenue, Suite 550 Seattle, WA 98101 206.739.5454 www.scjalliance.com
Contact:	Lisa M. Reid, PE, PMP lisa.reid@scjalliance.com Andrew Armstrong, EIT andrew.armstrong@scjalliance.com
Project Reference:	SCJ #21-000838, Phase 05, Task 01 Path: N:\Projects\4270 City of Orting\21-000838 Orting 2021-24 On-Call PE Services\Phase 05 - Pavement Management\05.01 2022 Street Condition Assessment\Reports

PROJECT ENGINEER'S CERTIFICATION

I hereby certify that this Pavement Management System for the City of Orting has been prepared by me or under my supervision and meets the minimum standards of the City of Orting and normal standards of engineering practice.

06-08-2023

Lisa M. Reid, PE, PMP
Lisa.Reid@scjalliance.com
206.739.5454

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Appendix C. Preservation Treatment Unit Costs
Appendix D. Program Costs

1. EXECUTIVE SUMMARY

The City of Orting believes in the importance of well-maintained public infrastructure and wants to ensure that the public traveling throughout the City continue to have safe and well-maintained roads to navigate. This pavement maintenance program will be developed and adopted to maximize the efficiency and value of maintaining the city's largest and most valuable form of infrastructure, its roadways.

2. INTRODUCTION

2.1 ORTING'S PAVEMENT INFRASTRUCTURE

The City of Orting is in Pierce County, Washington and encompasses an area of approximately 1,730 acres. The City of Orting is responsible for maintaining approximately 62 lane-miles of roadways consisting of asphalt concrete pavement (ACP), Portland cement concrete (PCC) and gravel roadways. This infrastructure was assessed and rated in conjunction with this program in 2022, and is shown in Appendix A.

2.2 INTRODUCTION TO PAVEMENT MANAGEMENT SYSTEM

This report summarizes the City of Orting's Pavement Management System (PMS) and identifies a 6-year program of preservation and maintenance activities that will provide cost-effective approaches to maintain pavements in serviceable conditions. The purpose of the PMS is to maintain City, resident, and business operations without impacts resulting from degrading roadways. Early investment in a well-planned PMS has proven to be the most cost-effective solution for management of a system of roadways, especially as opposed to a program that simply waits for failures then repairs or reconstructs pavements to correct issues.

Actions that help to slow the rate of deterioration and delay major rehabilitation activities are considered preservation. Preservation impacts performance life, durability, lifecycle costs, construction, and materials use. Identifying and addressing specific deficiencies that contribute to overall deterioration can prolong or extend the life

> Applying a pavement preservation treatment at the right time (when), on the right project (where), with quality materials and construction (how) is a critical investment strategy for optimizing infrastructure performance. The "when and where" component supports preservation by managing pavements proactively. Whole-life planning defines expectations for the long term and provides more stability to the cost of operation and maintenance. Identifying preservation strategies at the network level reduces the need for frequent or unplanned reconstruction. The "how" component promotes quality construction and materials practices, including treatment options that apply to flexible and rigid pavements. These practices contribute to improved pavement performance, providing smoother, safer roads and delaying the need for rehabilitation.
>
> FHWA, Everyday Counts, EDC-4

of pavements or structures. It is important to apply the right treatment to the right pavement or structure at the right time.[1]

Pavement networks require significant, recurring investments to maintain, which only increases as pavement ages. Spending money earlier in a pavement's life cycle allows for a significant extension in the pavement's life at a much cheaper cost than if this maintenance work is delayed (see Figure 1 and Figure 2). This shows the importance of timely maintenance, rather than just waiting until roads reach a poor quality. This program's goal is to maintain and preserve the overall condition of their street network in a state of good repair rather than just reacting in a worst first manner. This will allow the roadway network to stay sustainable while using funds in the most effective manner possible.

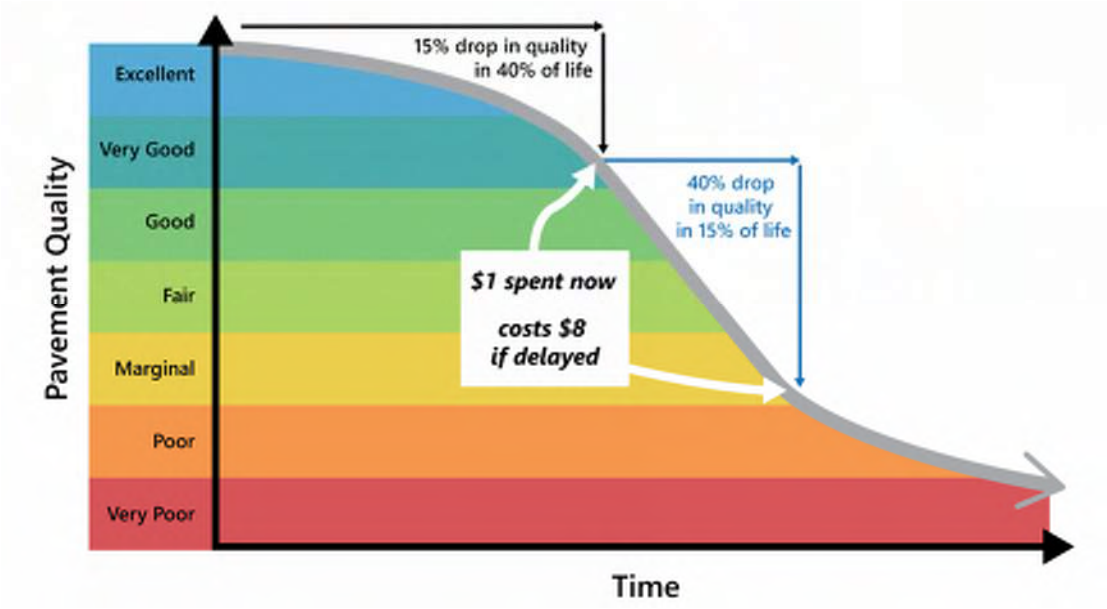

Figure 1. Pavement Degradation Curve (IMS, 2020)

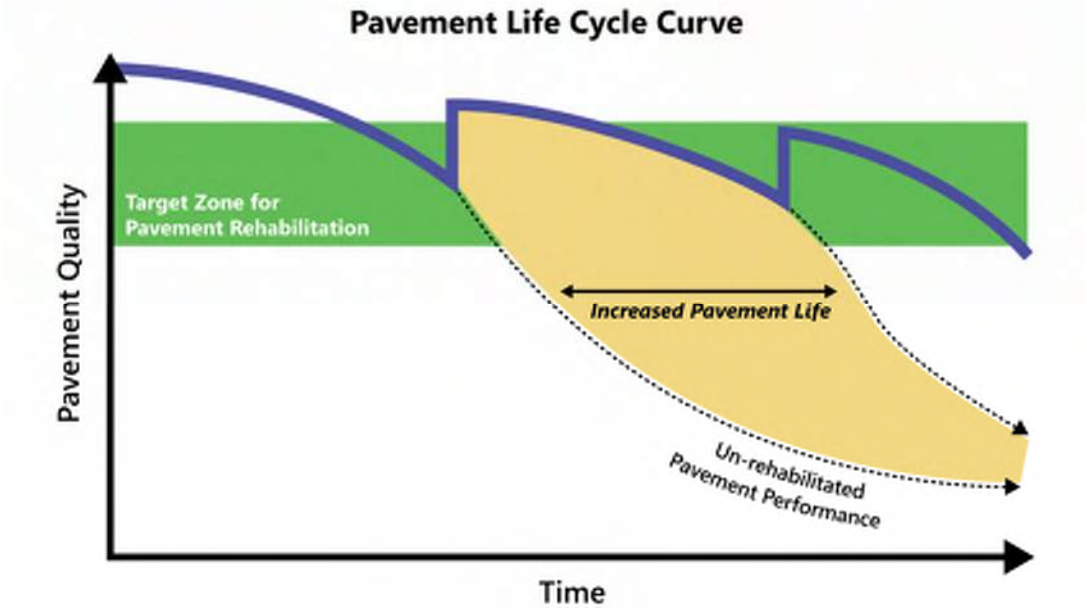

Figure 2. Pavement Rehabilitation Target Zone (IMS, 2020)

2.3 PRINCIPLES OF A PMS

The main priority of this PMS is to maximize the effectiveness of maintenance funds to preserve and maintain the City's pavement infrastructure. Often this will prioritize maintaining higher quality streets rather than reconstructing lower quality streets due to the difference in costs associated with different repair options. Arterials and collectors will generally have a higher importance than local access roads due to the repairs benefiting more people.

This program should coordinate with other street projects when possible. Other street projects provide an ideal time to address necessary maintenance due to the decreased mobilization costs as well as the decreased negative effects on residents (less road closures, less waste, fewer damage claims, etc.).

It is important to prioritize communication to the public with this program. Residents may see a good road being maintained and a poor road being seemingly ignored and feel the city is playing favorites. Communicating that the poor road is waiting on grants or other forms of outside funding, and that it is much cheaper to ensure good roads stay good than to make poor roads good again, may be necessary to ensure the program is not viewed negatively.

2.4 PAVEMENT PRESERVATION

Pavement preservation is defined as "a program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety and meet motorist expectations". This PMS accomplishes these goals by assessing the quality of roads and then using the ratings to determine appropriate and timely treatments.

Pavement preservation programs commonly include multiple treatment activities and focus on the preventive maintenance level. Preventive maintenance is defined as "a planned strategy of cost-effective treatments to an existing roadway system and its appurtenances eliminate age-related, top-down surface cracking that develops in flexible pavements due to environmental exposure or to restore functionality of concrete pavements." This is generally the most effective use of funds, although some roads necessitate reconstruction or overlay as well (Geiger, 2005).

2.4.1 Distress Types

The following pavement distresses were used in the 2022 evaluation of pavement conditions throughout the City (see Appendix A). The bullets below describe what causes the distresses as well as typical preservation treatments that can address each distress condition.

- **Rutting** and wear is caused by repeated traffic loads along the same path and are characterized by surface depressions in the wheel path. Ruts due to only wear just need to be paved in. Ruts due to subgrade movement require rehabilitation that will improve the base materials such as in-place recycling or full depth reconstruction.
- **Alligator cracking** is caused by a loss of support from beneath the pavement. The methods to fix it rely on fixing the support beneath the pavement through an in-place recycle or full depth reconstruction.

- **Longitudinal, transverse, and block cracking** all have several causes but are present similarly on the surface. All can be crack sealed to prevent moisture from infiltrating the pavement. One method to fix the cracks is to mill and fill, although some may need full depth reconstruction.
- **Raveling and aging** occur when the aggregate or binder, respectively, wear away from the pavement. This can be fixed by microsurfacing, crack sealing, chip sealing, or milling and filling.
- **Flushing and bleeding** occur when excessive binder shows on the pavement surface. This can be fixed by applying sand to absorb the excess binder or a mill and fill.
- **Patching**, when in need of fixing, generally requires localized full depth reconstruction to ensure the same distresses do not reoccur.
- **Sags and humps** can occur due to settlement or frost heave, and it is important to determine which before repairing it. They can be repaired by mill and fill or in-place recycling, depending on the root cause of the issue.
- **Edge raveling** happens often near gravel driveways, and it can temporarily be fixed by surface edge patching. Edge potholes and lanes less than 10 feet can be fixed by full depth edge patches.

2.4.2 Pavement Treatment Types

There are many pavement treatments that can be used in a PMS. Common preservation and maintenance treatments are included below (all costs are in 2023 dollars):

Preservation treatments are used to maintain existing pavement assets and extend usable life. These treatments are typically low cost to implement, with $12 per LF of 11’ wide lane being repaired serving as a rough assumption of construction cost in general and $2 per LF of 11’ wide lane for crack sealing.

- Crack Seal
- Micro-surfacing
- Chip Seal
- Sand Application

Methods used in large scale maintenance activities or involved where pavement assets require preservation or rehabilitation. These treatments can trigger adjacent ADA improvement requirements depending on the scope of the treatment. Neglecting these potential ADA improvements, treatments in this category can be assumed to cost roughly $45 per LF of 11’ wide lane being replaced.

- Surface Patching
- Full-depth Patching
- Mill and Fill
- Overlay without Grinding/Fill

In some cases, the pavement asset is beyond maintenance and will require full depth replacement or repair. Note that full depth reconstruction could be the pavement or the pavement and subgrade. Reconstruction treatments can trigger adjacent ADA improvement requirements as well, and these costs need to be considered when implementing these treatment types. Ignoring ADA improvements, reconstruction may cost $142 per LF of 11’ wide lane being replaced.

- In-Place Recycling
- Full-Depth Reconstruction – Pavement Only
- Full-Depth Reconstruction – Pavement and Subgrade

3. PAVEMENT MANAGEMENT SYSTEM

3.1 INTRODUCTION

This Pavement Management System (PMS) includes all activities involved in maintaining the City's roadway including data, procedures, analysis, and a 6-Year Workplan. This Workplan is shown in Chapter 4 of this Program and shows a 6-year list of projects and includes both construction, and non-construction, activities. Updates to the Workplan are necessary bi-annually.

3.2 ELEMENTS OF A PMS

- 6-Year PMS Workplan Development (2024 to 2029)
    - Baseline Pavement Condition Assessment (2022)
    - Construction Activity Planning & Prioritization
        - Pavement Condition Overall Ratings
        - Prioritization of segments
        - Determining Preservation and Maintenance Treatments Needed
        - Costs to Repair
        - Annual Budget
        - Analysis of the System
        - 6-year Workplan
    - Non-Construction Activities
        - Inspection
        - Overall Rating by Section
        - Prioritization
        - Updating Treatments if Necessary
        - Updating Program Costs
        - Revising TIP as Needed
- Annual Workplan Implementation
    - Construction
        - Plan Sets and Engineering
        - Bidding
        - Coordination with Other Agencies
        - Construction Management
    - Non-Construction
        - Pavement Condition Assessment Updates
        - TIP Updates
        - PMS Updates
        - Administrative Updates
            - Funding Activities
            - GIS Updates

4. 6-YEAR PMS WORKPLAN

4.1 BASELINE PAVEMENT CONDITION ASSESSMENT (2022)

The pavement condition assessment SCJ Alliance performed in 2022 rated roads based on visual inspection. This inspection led to overall ratings for each roadway, which were then used to develop this 6-year Workplan. Bi-annual updates to this system will be performed and reviewed to make sure there are no substantial condition changes that require reprioritization of which roadways to treat.

4.2 CONSTRUCTION ACTIVITY PLANNING & PRIORITIZATION

Prioritization strategies used in the report develop a targeted list of segments with current distresses and provides a snapshot status of the pavement network. From this, project planning is done to maximize the value of pavement maintenance operations given the condition of the City's infrastructure and to coordinate with nearby or currently planned improvement projects.

4.2.1 Pavement Condition Overall Ratings

Pavement condition ratings were calculated using a formula that weighed distresses by their extent, severity, and level of impact to the condition of the roadway. The full assessment is included in Appendix A and the final roadway section ratings are shown in Figure 3 on the next page.

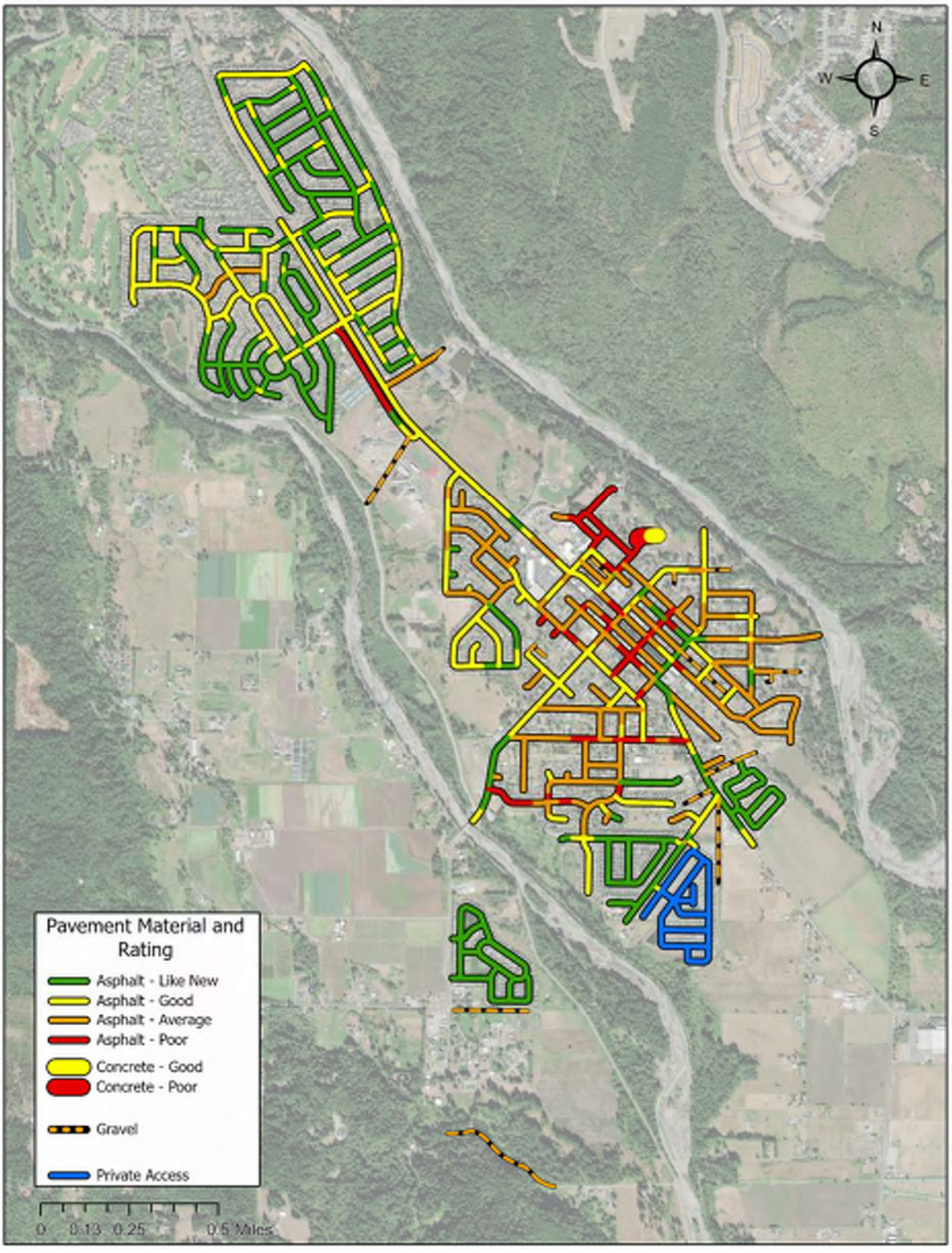

Figure 3. 2022 Pavement Condition Overall Ratings

4.2.2 Prioritization of Segments

Projects were prioritized by treatments needed (based on segment conditions), timing of other projects, and with the goal of minimizing the overall cost of the program. Preventative work is prioritized over maintenance in order to maximize the efficiency of dollars spent. Reconstruction projects are balanced with Kansas and Whitehawk with the goal of having one major project each year. This also allows the costs to be evenly balanced over the years and to be more manageable by the City. Overlays and reconstructions are predated by preventative treatments to allow the pavement to stay functional until the maintenance work can take place. Finally, projects with the same treatment are grouped when possible, to allow for the lowest prices based on the economy of scale.

4.2.3 Determining Preservation and Maintenance Treatments Needed

Different distresses are better addressed with different maintenance treatments. While this program uses crack sealing, chip sealing, mill and fill, and full-depth reconstruction as the 4 fundamental reconstruction methods for cost estimating purposes, the repair methods shown in Table 1 are still included so they can be examined once a project has been selected and is in more in-depth planning.

Table 1. Distresses and Associated Preservation/Repair Methods

Distress	Crack Seal	Microsurfacing	Chip Seal	Sand Application	Surface Patching	Full-Depth Patching**	Mill and Fill**	In-Place Recycle**	Full-Depth Reconstruction**
Rutting and Wear					●	●		●	●
Alligator Cracking	●	●	●			●		●	●
Cracking	●	●	●				●		●
Raveling and Aging	●	●	●				●		
Flushing and Bleeding				●			●		
Patching						●			
Sags and Humps							●	●	
Edge Raveling					●	●			
Edge Potholes					●	●			

*** May trigger adjacent ADA improvements based on the scope and location of work.*

Several of the preservation and repair methods listed in **Table 1** may trigger a requirement to make adjacent ADA improvements. It is important to understand which will trigger this requirement, as this could alter the cost estimate and perhaps require rescheduling repairs. These repairs include full-depth reconstruction, in-place recycling, milling, and filling, and, sometimes, full-depth patching.

4.2.4 Preservation Costs

One of the goals of this maintenance program is to schedule roadway repairs on a frequent, recurring basis. Scheduling annually will allow yearly funds to be used efficiently and will ensure roads do not slip between the cracks and worsen before treated. Scheduling rehabilitation methods annually ensures there is budget to address the minor issues before they become more significant.

Costs of different treatment options can vary significantly. The following total costs of treatment were used in this analysis. These costs are shown per lane-foot (per linear-foot in length of 11-foot-wide lane). Appendix C includes the calculations for each treatment:

- Crack Sealing – $2/LF of 11' lane
- Chip Seal Coat – $12/LF of 11' lane
- Mill and Pavement Overlay – $45/LF of 11' lane
- Reconstruction – $142/LF of 11' lane

In addition to the basic construction costs, the total costs include all contingency, engineering, administration, and inflation costs. The following percentages were used to calculate total costs for each treatment.

Table 2. Total Cost Elements

Cost Element	% Construction	Description
Design Contingency	10% of itemized construction costs	Estimates the construction costs of minor design elements that have not yet been identified (e.g., pavement markings, minor ADA improvements)
Inflation/Year	3% of itemized construction costs	Escalates the construction costs from 2023 to the year of construction.
Permitting	3% of total construction cost	Estimates permit costs for the City. Does not include environmental documentation.
Design	12% of total construction cost	Estimates costs to prepare PS&E and environmental documentation.
City PM/Administration	3% of total construction cost	Estimates City costs for administration and oversight of the project.
Construction Management	15% of total construction cost	Estimates construction inspection and management for the project.
Management Reserve	10% of total construction cost	Overall contingency for the project – reduces as the project definition progresses.

4.2.5 Analysis of the System

Poor roads were analyzed first using their functional class and likely cost. Kansas Street Reconstruction, a project included in the city's 2022-2027 TIP and currently in design, will repair the road most in need of reconstruction. Another strong candidate for reconstruction is Old Pioneer Way. Old Pioneer Way, and other future candidates for reconstruction projects, are shown in

Table 3. Note that it is proposed to maintain an annual budget of $150k for selected spot pavement replacements – to fix recurring potholes or minor instances of failed pavement.

Table 3. Reconstruction Projects

Project	Construction Cost (in 2022 dollars)	Linear Feet of Lanes	Year Scheduled
Train Street Reconstruction (Eldredge Avenue to Ammons Lane)**	$415,000	2,917	2026
Skinner Way Reconstruction (Calistoga Street to Belfair Avenue)**	$273,000	1,915	2027
Bowlin Avenue Reconstruction (Parker Lane to Leber Street)**	$260,000	1,828	2028
Old Pioneer Way Reconstruction (North of Chief Emmons Lane)**	$404,000	2,842	2029
TBD – Annual Reconstruction (includes spot replacements)	$150,000 per year	NA	2024-2029

*** Each of these streets is also included in the crack sealing program in 2024 to maintain their current condition prior to reconstruction.*

Although it is good to keep in mind the poor roads that will need to be reconstructed, due to their high funding needs, it is more efficient to spend money on roads that have not yet reached this level of disrepair. Due to this, the average roads were analyzed next to determine ideal cases for an overlay project. Corrin Avenue, from Whitesell Street to Bridge Street, is a strong candidate for a mill and overlay project due to its cracking and aging as well as its status as a minor arterial. Eldredge Avenue, from Whitesell Street to Calistoga Street is another strong candidate for a mill and overlay due to its aging and patches. These, and other, candidates for a mill and overlay project are shown in Table 4. Note again that an annual overlay budget of $80k is proposed after 2026 to address specific overlays that will be needed.

Table 4. Overlay Projects

Project	Construction Cost (in 2022 dollars)	Linear Feet of Lanes	Year Scheduled
Corrin Avenue Overlay (Whitesell Street to Bridge Street)	$179,000	3,986	2024
Eldredge Avenue Overlay (Whitesell Street to Calistoga Street)	$90,000	1.990	2024

Project	Construction Cost (in 2022 dollars)	Linear Feet of Lanes	Year Scheduled
Anderson Street Overlay (Williams Street to Boatman Avenue)	$99,000	2,203	2024
Orting Avenue (Callendar Street to Whitehawk Boulevard)	$61,000	1,358	2028
Deeded Lane (Calistoga Street to Eldredge Avenue)	$145,000	3,216	2024
Ammons Lane (Leber Street to River Avenue)	$135,000	2,994	2028
Corrin Avenue Overlay (South of Harman Way)**	$93,000	2,060	2028
Brown Street and Brown Way**	$134,000	2,983	2028
Washington Avenue (South of Bridge Street)**	$150,000	3,330	2028
TBD – Annual Overlay after 2026	$80,000 per year		2027-2029

*** Each of these streets is also included in the crack sealing program in 2024 to maintain their current condition prior to overlay.*

Finally, the most efficient use of funding is to keep good roads good. Chip and crack sealing are both cheap and effective maintenance methods. Chip sealing is generally better if the road is aging and/or has several cracks, while a road without aging and with only a few cracks will likely be better served with crack sealing. Crack sealing is also appropriate when old crack seals are beginning to crack again.

Crack sealing would be appropriate on Calistoga Street between Ammons Lane and River Avenue as well as Callendar Street between Thompson Avenue and Groff Avenue. Chip sealing would be appropriate along Whitehawk Boulevard, between Washington Avenue and Orting Avenue, and Calistoga Street, from Kansas Street to Corrin Avenue. Crack sealing projects are shown in Table 5, while chip sealing projects are shown in
Table 6. Both tables include annual programs of $25k and $30k per year respectively to begin after this set of projects is completed.

Table 5. Crack Seal Projects

Project	Construction Cost (in 2022 dollars)	Linear Feet of Lanes	Year Scheduled
Boatman Avenue/Cloud Street/Nunnally Avenue Crack Seal (Lane Boulevard to Colorossi Circle)	$9,000	3,871	2024
Icey Street Crack Seal (East of Grinnell Avenue)	$4,000	1,729	2024

Project	Construction Cost (in 2022 dollars)	Linear Feet of Lanes	Year Scheduled
Grinnell Avenue Crack Seal (South of Balmer Street)	$4,000	1,642	2024
Williams Boulevard/Avenue/Court Crack Seal (West of Headley Avenue)	$8,000	3,356	2024
Williams Street Crack Seal (Ozzie Street to Williams Avenue)	$7,000	2,845	2024
Mellinger Avenue Crack Seal (Williams Street to Williams Boulevard)	$4,000	1,685	2024
Nunally Avenue Crack Seal (Cloud Street to Williams Boulevard)	$5,000	1,960	2024
Lane Boulevard Crack Seal (Nunnally Avenue to Washington Avenue)	$5,000	2,086	2024
Thompson Avenue Crack Seal (Callendar Street to Groff Avenue)	$4,000	1,688	2024
Calistoga Street Crack Seal (Ammons Lane to River Avenue)	$5,000	1,831	2024
Callendar Street Crack Seal (Thompson Avenue to Groff Avenue)	$4,000	1,676	2024
Train Street Reconstruction (Eldredge Avenue to Ammons Lane)**	$7,000	2,917	2024
Skinner Way Reconstruction (Calistoga Street to Belfair Avenue)**	$5,000	1,915	2024
Bowlin Avenue Reconstruction (Parker Lane to Leber Street)**	$5,000	1,828	2024
Old Pioneer Way Reconstruction (North of Chief Emmons Lane)**	$7,000	2,842	2024
Corrin Avenue Overlay (South of Harman Way)**	$5,000	2,060	2024
Brown Street and Brown Way Overlay**	$7,000	2,983	2024
Washington Avenue Overlay (South of Bridge Street)**	$8,000	3,330	2024

Project	Construction Cost (in 2022 dollars)	Linear Feet of Lanes	Year Scheduled
TBD – Annual Crack Seal After 2024	$25,000 per year		2025-2029

** *Each of these streets is included for crack sealing prior to a subsequent overlay or reconstruction.*

Table 6. Chip Seal Projects

Project	Construction Cost (in 2022 dollars)	Linear Feet of Lanes	Year Scheduled
Olive Street Chip Seal	$10,000	749	2025
Whitehawk Boulevard Chip Seal (Washington Avenue to Orting Avenue)	$74,000	5,617	2025
Calistoga Street Chip Seal (Kansas Street to Corrin Avenue)	$55,000	4,222	2025
Tacoma Avenue Chip Seal	$24,000	1,770	2025
Stone Street Chip Seal (Headley Avenue to Mellinger Avenue)	$13,000	982	2025
Eldredge Avenue Chip Seal (Calistoga Street to Kansas Street)	$44,000	3,313	2025
TBD – Annual Chip Seal After 2025	$30,000 per year		2026-2029

4.2.6 Annual Budget

The annual budget varies depending on several assumptions, including the overall extent of preservation treatments needed (defined by total construction costs), the aggressiveness of making preservation treatments (generally controlled by total years of preservation program/cycle), and availability of funding. The total construction costs are constant for a given year. The total years of the preservation cycle is based on the TIB cycle as balancing the number of roads in need of maintenance with a reasonable annual budget (targeted at $1M to 1.3M annually in 2024 based on similar local agencies). The availability of funding changes based on government programs and the City's budget.

The annual budget, shown in Table 7, was estimated at $1.15M for the first 2 years, $1.25 million for years 3 and 4 and $1.35 million for years 5 and 6.

Table 7. Annual Budget

Year #	Year	Cost
1	2024	$1,150,000
2	2025	$1,150,000
3	2026	$1,250,000
4	2027	$1,250,000
5	2028	$1,350,000
6	2029	$1,350,000

4.2.7 6-Year Workplan

This workplan needs to account for the roadway projects currently planned. These are the Kansas Street Reconstruction and the Whitehawk Boulevard Road Extension. The Kansas Street Reconstruction is a major reconstruction project that is currently in design while the Whitehawk Boulevard Road Extension is currently in the planning stages. For the purposes of this program, it will be assumed that these two projects will reconstruct all of Kansas Street and remedy any pavement needs in Whitehawk Boulevard and they were not factored into the pavement preservation budget. See Table 8 for a list of all of the projects covered in the 6-year Workplan. Note that the Annual Budgets will be used to address projects TBD throughout that year (as the PS&E is being prepared) and will include monies for ongoing pavement preservation and maintenance activities.

Table 8. 6-Year Workplan

Location and Treatment	Year of Construction
2024	
Corrin Avenue Overlay (Whitesell Street to Bridge Street)	2024
Eldredge Avenue Overlay (Whitesell Street to Calistoga Street)	2024
Anderson Street Overlay (Williams Street to Boatman Avenue)	2024
Orting Avenue Overlay (Callendar Street to Whitehawk Boulevard)	2024
Boatman Avenue/Cloud Street/Nunnally Avenue Crack Seal (Lane Boulevard to Colorossi Circle)	2024
Icey Street Crack Seal (East of Grinnell Avenue)	2024
Grinnell Avenue Crack Seal (South of Balmer Street)	2024
Williams Boulevard/Avenue/Court Crack Seal (West of Headley Avenue)	2024
Williams Street Crack Seal (Ozzie Street to Williams Avenue)	2024
Mellinger Avenue Crack Seal (Williams Street to Williams Boulevard)	2024
Nunally Avenue Crack Seal (Cloud Street to Williams Boulevard)	2024
Lane Boulevard Crack Seal (Nunnally Avenue to Washington Avenue)	2024
Thompson Avenue Crack Seal (Callendar Street to Groff Avenue)	2024
Calistoga Street Crack Seal (Ammons Lane to River Avenue)	2024
Callendar Street Crack Seal (Thompson Avenue to Groff Avenue)	2024
Train Street Reconstruction (Eldredge Avenue to Ammons Lane)*	2024
Skinner Way Reconstruction (Calistoga Street to Belfair Avenue)*	2024
Bowlin Avenue Reconstruction (Parker Lane to Leber Street)*	2024
Old Pioneer Way Reconstruction (North of Chief Emmons Lane)*	2024

Location and Treatment	Year of Construction
Corrin Avenue Overlay (South of Harman Way)**	2024
Brown Street and Brown Way Overlay**	2024
Washington Avenue Overlay (South of Bridge Street)**	2024
Annual Pavement Reconstruction Budget $150K	2024
2025	
Deeded Lane Overlay (Calistoga Street to Eldredge Avenue)	2025
Ammons Lane Overlay (Leber Street to River Avenue)	2025
Olive Street Chip Seal	2025
Whitehawk Boulevard Chip Seal (Washington Avenue to Orting Avenue)	2025
Calistoga Street Chip Seal (Kansas Street to Corrin Avenue)	2025
Tacoma Avenue Chip Seal	2025
Stone Street Chip Seal (Headley Avenue to Mellinger Avenue)	2025
Eldredge Avenue Chip Seal (Calistoga Street to Kansas Street)	2025
Annual Crack Seal Budget $25K	2025
Annual Pavement Reconstruction Budget $150K	2025
2026	
Train Street Reconstruction (Eldredge Avenue to Ammons Lane)	2026
Corrin Avenue Overlay (South of Harman Way)	2026
Annual Chip Seal Budget $30K	2026
Annual Crack Seal Budget $25K	2026
Annual Pavement Reconstruction Budget $150K	2026
2027	
Skinner Way Reconstruction (Calistoga Street to Belfair Avenue)	2027
Brown Street and Brown Way Overlay	2027
Annual Overlay Budget $80K	2027
Annual Chip Seal Budget $30K	2027
Annual Crack Seal Budget $25K	2027
Annual Pavement Reconstruction Budget $150K	2027
2028	
Bowlin Avenue Reconstruction (Parker Lane to Leber Street)	2028
Washington Avenue Overlay (South of Bridge Street)	2028
Annual Overlay Budget $80K	2028
Annual Chip Seal Budget $30K	2028
Annual Crack Seal Budget $25K	2028
Annual Pavement Reconstruction Budget $150K	2028
2029	
Old Pioneer Way Reconstruction (North of Chief Emmons Lane)	2029
Annual Overlay Budget $80K	2029
Annual Chip Seal Budget $30K	2029
Annual Crack Seal Budget $25K	2029
Annual Pavement Reconstruction Budget $150K	2029
** Crack Seal prior to scheduled reconstruction* ***Crack Seal prior to scheduled overlay*	

4.3 NON-CONSTRUCTION ACTIVITIES

4.3.1 Inspection

This PMS is reliant on knowing the distresses present on streets, which is used to determine their overall quality. This knowledge will come from inspecting the pavement on a 6-year basis. All arterial and collector streets should be evaluated once every 2 years, while the local access streets should be split into a 6-year cycle with 1 section being looked at every 2 years. Table 9 shows the recommended split for the local access roads on a 3-section cycle, while Figure 4 on page 25 shows the groups on a map. Each year is budgeted $50,000 (in addition to the project costs shown in Table 8) to allow for inspection and PMS updates. These updates should follow the prioritization process included in this report.

Table 9. Annual Roadway Inspection Schedule

	Year of Roadway Inspection							
Inspection Group	**2022 (Baseline)**	**2024**	**2026**	**2028**	**2030**	**2032**	**2034**	**2036**
Group 1 (northern neighborhoods)	●	●			●			●
Group 2 (north of Eldredge)	●		●			●		
Group 3 (south of Eldredge)	●			●			●	
Group 4 (non-local access)	●	●	●	●	●	●	●	●

4.3.2 Overall Rating by Section

For all newly reviewed segments, compare the ratings given during the recent inspection cycle to the previous inspection cycle. This report serves as the implementation point. The map of current distressed pavements will help in re-prioritization of segments not previously considered as high traffic or in high rate of distress.

4.3.3 Prioritization

Segments found to be in major distress or potentially hazardous that require emergency repair efforts will be communicated to the City engineer directly. Segments that have a poor rating and are in requirement of full reconstruction are prioritized for outside funding, while segments that need rehabilitative maintenance are also outside funding candidates. Segments in low need of repair have the benefit of low-cost maintenance options and should be addressed earlier rather than later. These are a target for funds and maintenance activity as these road segments are still within service life and this life can be extended cheaply.

4.3.4 Updating Treatments if Necessary

This section will be updated ongoing to incorporate new policy making activity relevant to the pavement treatment activities to be implemented with local guidance from FHWA or WSDOT. This section includes

treatment types that may have not been previously implemented by the city or are new maintenance technologies that, with local guidance, are being implemented.

4.3.5 Updating Program Costs

Costs in the baseline 6-year Workplan are based on 2023 construction costs escalated to the year of construction. Costs will need to be updated to reflect inflation, or else the cost estimates shown in this report will quickly become dated. A standard 3% inflation factor may be used for future cost estimating, although the National Highway Construction Cost Index (NHCCI) provides a more roadway specific inflation factor that could be interpolated to find a more accurate factor (Federal Highway Administration).

4.3.6 Revising TIP as Needed

The City's transportation improvement plan, or TIP, will need to be updated using this program as a resource. These updates should take place after the roadway assessments have taken place and the roadways that could use funding the most efficiently have been identified.

4.4 SUMMARY

The PMS begins with inspections of the roads. A Workplan would then be assembled or revised by including new inspection data and re-prioritizing the roads that can be most cost-effectively addressed per the new inspection, which leads to an expected budget. This budget allows funding to be chased and projects to be addressed. Finally, the PMS must be updated with new costs, treatments, and inspections as necessary.

5. ANNUAL WORKPLAN IMPLEMENTATION

5.1 INTRODUCTION

From the data collected, activities to implement the maintenance strategies can then be conducted. First is the project list, or annual pavement preservation workplan, which lays out a list of projects for the city to consider over the next six years. The project list will be evaluated at the start of every year, and this engineering analysis will lead to an annual project list with bid documents attached. These projects will go to bidding, be awarded, and then after the construction project will be inspected and tested. Finally, a post-construction report will be written about each maintenance project.

5.2 CONSTRUCTION

A project list covering the next six years has been established. The original version will cover 2024-2029, and it will be updated after the roadways are inspected. This list will prioritize projects based on the elements listed out in this program, while also considering the annual budget. Construction season is generally from April through September or mid-October, and these projects may need to plan around this timeline.

5.2.1 Plan Sets and Engineering

PS&E need to be prepared annually for the program of projects and should be finalized as early in the year as possible, but no later than the end of March to allow the projects to be advertised for construction in the same calendar year.

5.2.2 Bidding

Projects with a schedule of less than 3 months will typically be advertised for bid by the end of March, and the bid should be finalized by the end of April. Projects scheduled for more than 3 months may need to begin during the next construction season or may take more than one construction season (esp. reconstruction projects).

5.2.3 Coordination with Other Agencies

Some projects in this program, especially those abutting State Route 162, may require coordination with WSDOT. Orting is in the WSDOT Olympic Region and could also contact the WSDOT Local Programs Headquarters for help with coordination.

Coordination with other agencies, especially Pierce County Roads, may be beneficial. This coordination could allow the price of projects to decrease through increasing the size of a project and the economy of scale.

5.2.4 Construction Management

All of the work scheduled for one year can typically be completed under one PS&E and one construction management contract that can be included with the design of the project or contracted separately.

5.3 NON-CONSTRUCTION

5.3.1 Pavement Condition Assessment Updates

As an ongoing part of the pavement condition assessment program, this section is to include updates to policy and procedures around the Pavement Condition assessment. This should also include any additions and updates to the pavement network and updates on previous construction activities completed or referenced in the previous inspection cycle.

This section should include updates and revisions to the data collection process and app or assessment methodology.

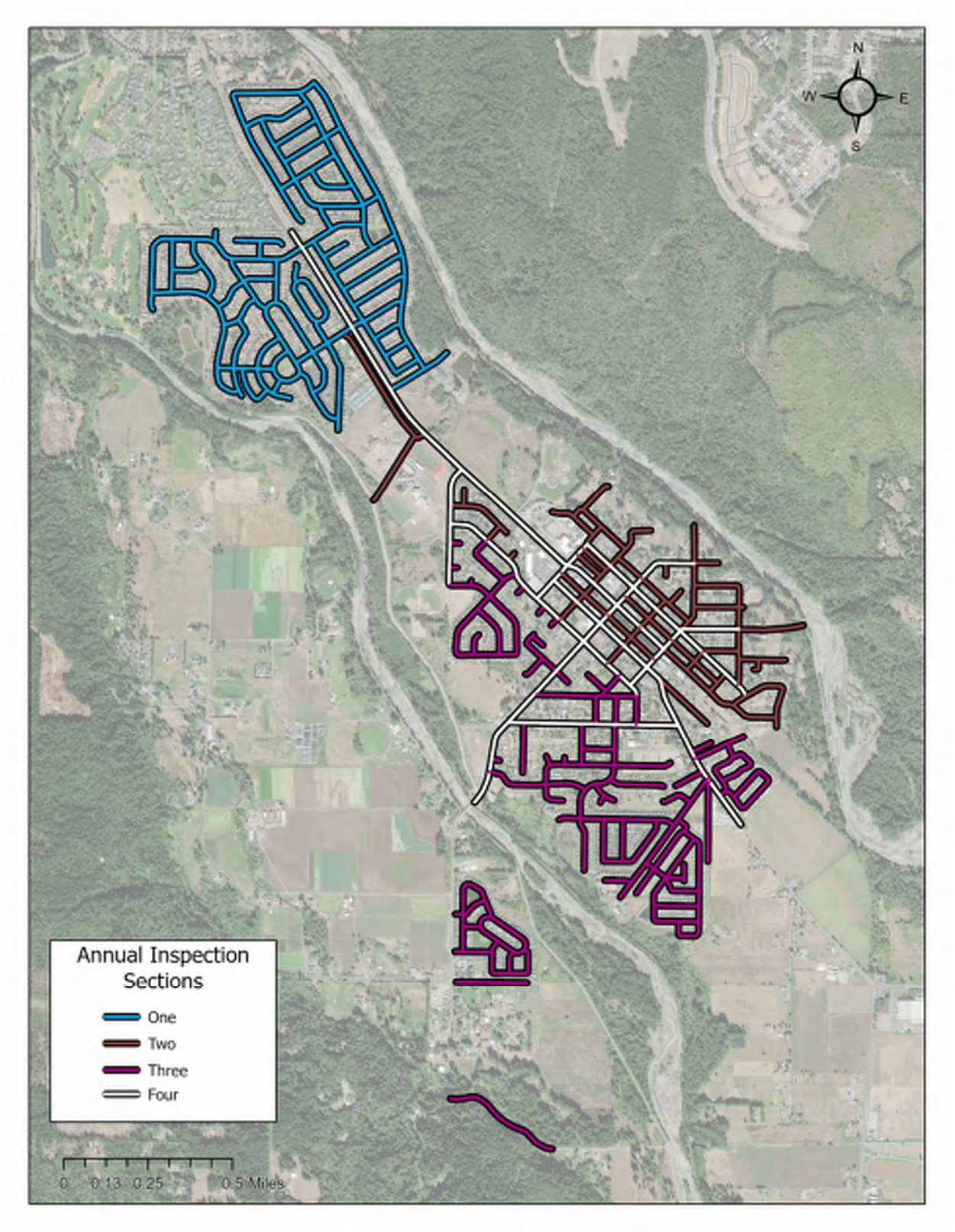

Figure 4. Annual Roadway Inspection Groups

5.3.2 TIP Updates

This section should include any anticipated or upcoming and planned construction projects that address nearby pavement deficiencies. By taking inventory of upcoming projects, the city can dedicate resources to projects not incorporated as part of larger capital improvement or frontage development project.

5.3.3 PMS Updates

This section will incorporate future and ongoing updates and revisions to the pavement management system.

5.3.4 Administrative Updates

Section to be updated as annual reporting strategy is implemented. This includes personnel and policy updates related to the Pavement Maintenance program and assessment.

5.3.5 Funding Activities

As this program is implemented, this section will include funding that has been obtained or is being sought at the time of assessment for current and future projects. A major source of this funding is expected to be the Washington State Transportation Improvement Board, TIB, which distributes maintenance grants throughout the state. Another potential source of funding is the Safe Routes to School Program through WSDOT.

5.3.6 GIS Updates

Segments produced from the pavement management program inception are updated with new segment photos at time of inspection. These segments are also intended to be updated post construction or maintenance activity along a given segment, the compliance of this is up to the maintenance program administrator.

5.4 SUMMARY

This report is intended to serve as a starting point and as guidance for ongoing and future pavement maintenance activities and procedures. As the city grows and the needs change, the City and program administrator will need to make ongoing updates to this report to reflect the present and ongoing needs of the pavement system.

6. CONCLUSION

The pavement maintenance recommended and included in this report are intended to be used as a planning tool. Further engineering judgment and field verification is necessary before preparing final maintenance plans for each year.

APPENDIX A

2022 PAVEMENT CONDITION ASSESSMENT REPORT (ATTACHED WITHOUT APPENDICES)

2022 Pavement Condition Assessment

ORTING
Washington

February 2023

SCJ ALLIANCE
CONSULTING SERVICES

2022 Pavement Condition Assessment

Project Information

Project:	2022 Pavement Condition Assessment
Prepared for:	City of Orting PO Box 489 Orting, WA 98360 Contact Name: John Bielka Contact Phone: 360.706.7206

Project Representative

Prepared by:	SCJ Alliance 1201 Third Avenue, Suite 550 Seattle, WA 98101 206.739.5454 www.scjalliance.com
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Project Reference	SCJ #21-000838, Phase 05, Task 01
	Path: N:\Projects\4270 City of Orting\21-000838 Orting 2021-24 On-Call PE Services\Phase 05 - Pavement Management\05.01 2022 Street Condition Assessment\Reports\Assessment Final Draft

PROJECT ENGINEER'S CERTIFICATION

I hereby certify that this Pavement Condition Assessment for the City of Orting has been prepared by me or under my supervision and meets the minimum standards of the City of Orting and normal standards of engineering practice.

2-12-23

Lisa M. Reid, PE, PMP
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1. EXECUTIVE SUMMARY

SCJ Alliance performed this pavement condition assessment from September to October, 2022, to assess the City of Orting's roadway network according to WSDOT's recommended methods per the Northwest Pavement Management Association's (NWPMA) Pavement Surface Condition Field Rating Manual for Asphalt Pavements (PSCFRM). This manual is included in Appendix D. The assessments were made by a two-person team to visually qualify and physically quantify various pavement distresses that are discussed further in Chapter 4.3 and include:

1. Rutting
2. Alligator Cracking
3. Longitudinal Wheel Path Cracking
4. Longitudinal Non-wheel Path Cracking
5. Transverse Cracking
6. Raveling and Aging
7. Flushing and Bleeding
8. Patching
9. Corrugation and Waves (not observed)
10. Sags and Humps
11. Block Cracking (not observed)
12. Pavement Edge Condition
13. Crack Seal Condition

Based on the cumulative presence or lack of these distresses, each roadway segment was given an overall rating of poor, average, good, or new. A summary of the overall quality of the City of Orting's roadway network is shown in Figure 1 below. Roadway segments were primarily in good or like new quality, as seen in Figure 2 on page 8. Kansas Street and Old Pioneer Way were found to have multiple, consecutive, notably low-quality segments along their limits.

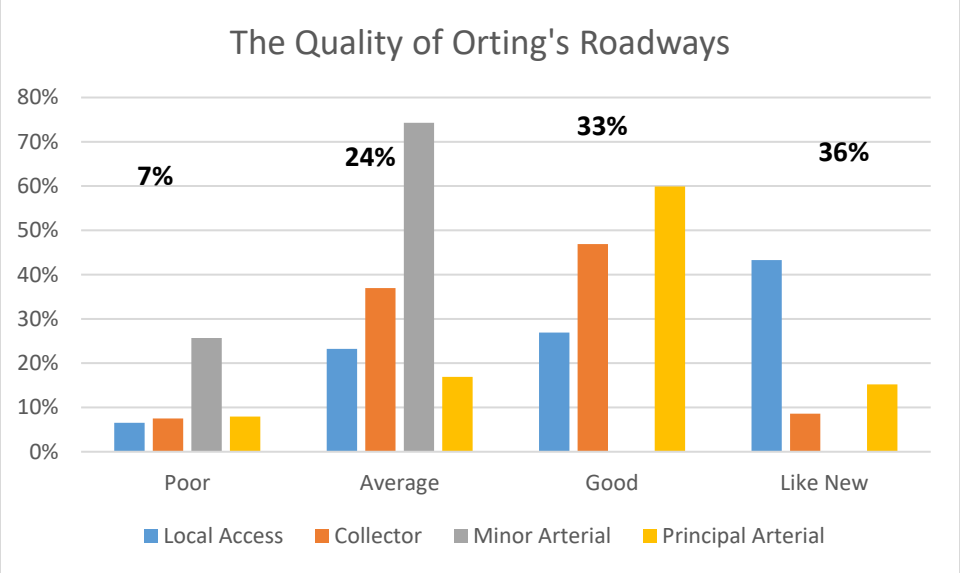

Figure 1. Overall Pavement Condition Ratings Summarized by Functional Class

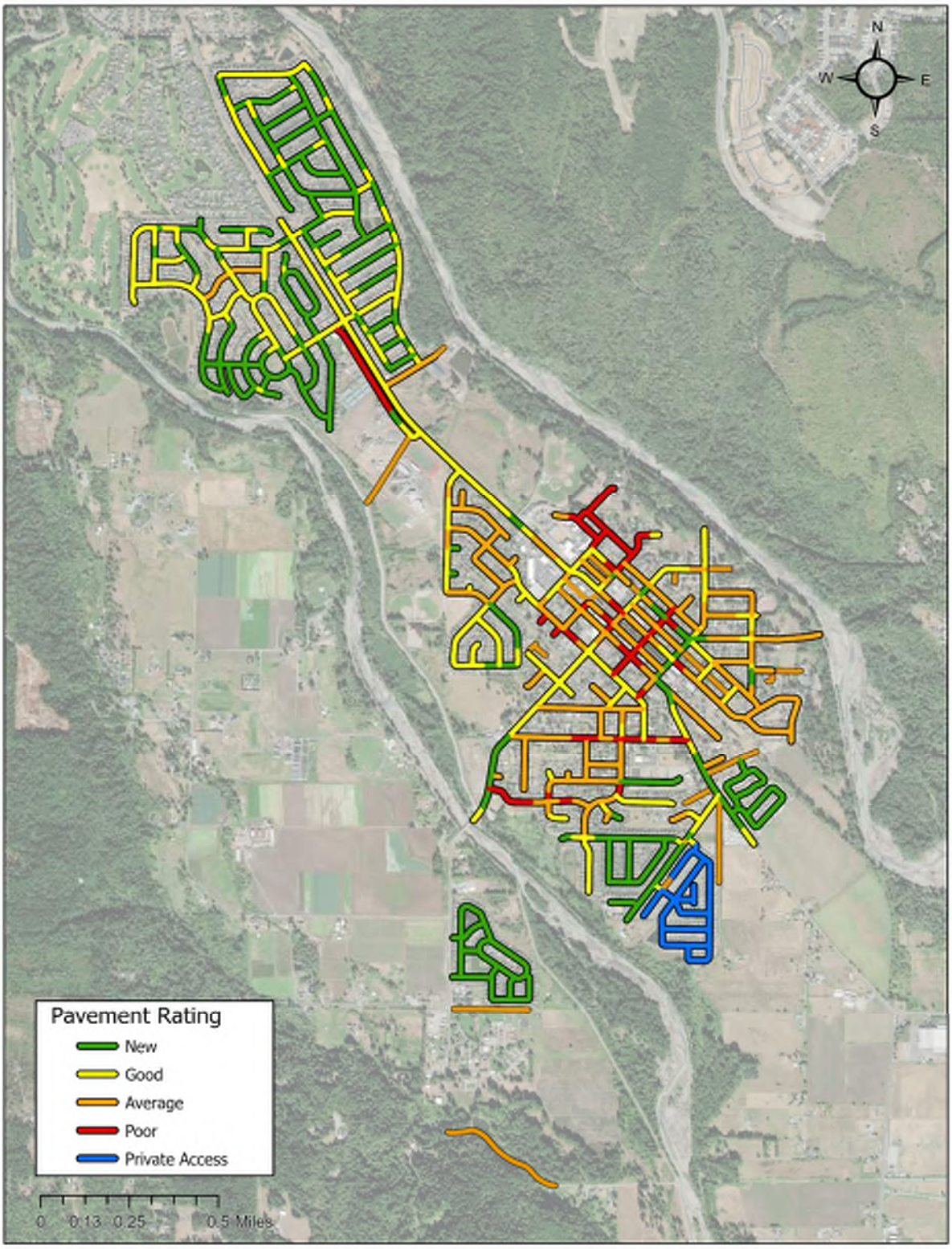

Figure 2. Roadways by Overall Rating

The most significant of the poor segments were along Kansas Street, which is a principal arterial south of downtown. This roadway was observed being used by commercial trucks to bypass downtown and the frequent high loads have deteriorated the pavement to a poor condition. At the time of assessment, a planned reconstruction of Kansas Street is scheduled to begin in 2024.

The other, notably poor roadway is Old Pioneer Way, which is a local access road that starts at State Route 162 (SR 162) and runs parallel for several blocks and dead-ends before reaching Lane Blvd. NW. There were both commercial and residential developments along this roadway and it is a much lower traffic roadway than Kansas Street. These two roads, combined with a few other sporadic segments, make up the roughly 7% of roads in Orting with a poor condition.

In addition, approximately 24% of the roadways were rated average and would also benefit from a variety of pavement and maintenance activities.

2. INTRODUCTION

This report summarizes the methods and results of the pavement condition assessment that were conducted within the City of Orting limits. The report should be used to understand the condition evaluation process for future pavement condition assessments, to understand the current pavement condition ratings, and to understand the data contained in the city's GIS database. This pavement condition assessment was necessary to establish a baseline of the existing condition of the roads within the city. This report will serve as a basis for future projects and on-going pavement maintenance and preservation planning and programming.

This report contains a description of the roads in Orting and a description of the distresses assigned to roads. The roads of Orting are broken down by pavement type and functional classification. The distresses are broken down individually with photographs from the field and maps showing where these distresses were observed. For each segment, the cumulative frequency and severity of distresses were considered and an overall rating was assigned to provide a qualitative and comparative ranking as seen on Figure 1, page 7, and Figure 2, page 8.

3. CITY OF ORTING ROADWAY SYSTEM

3.1 CITY OF ORTING ROADWAY SYSTEM

The City of Orting roadway network includes 62.7 lane-miles of asphalt concrete pavement (ACP), 2.5 lane-miles of gravel, and 0.1 lane-miles of Portland concrete pavement (PCC). This corresponds to the network being 96% ACP, 3.9% gravel, and 0.1% PCC. PCC is found primarily on older, local access roads in the downtown core. Gravel roads were recorded on alleys through downtown as well as some side streets, especially those near the edge of town. The pavement material of each roadway segment is shown in Figure 3 on page 10.

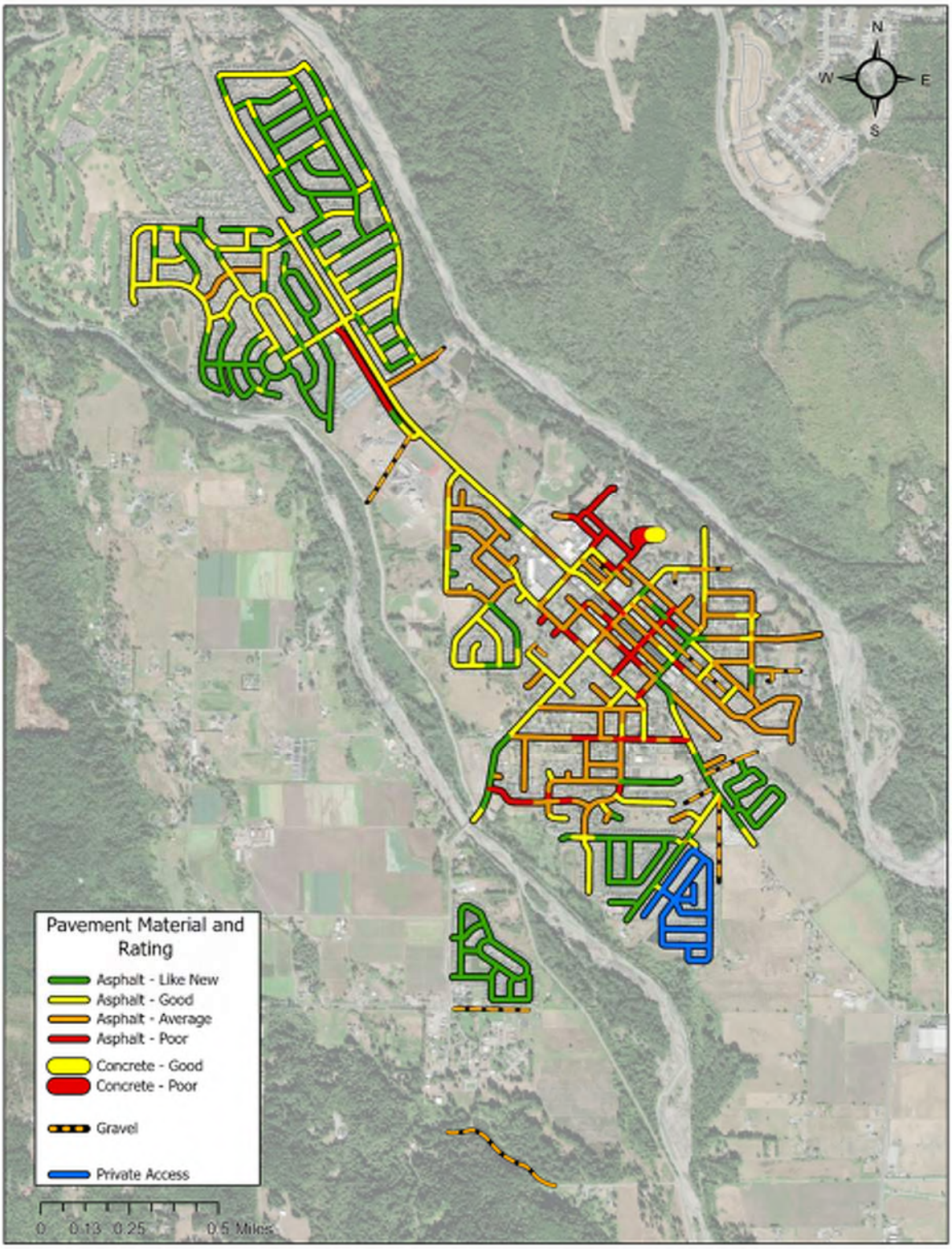

Figure 3. Roadways by Material and Overall Rating

Orting's roads are assigned a functional classification based on the volume of traffic using each roadway and the purpose of the roadway. Orting has 49.7 lane-miles of local access roads (76%), 5.2 lane-miles of collector roads (8%), 0.8 lane-miles of minor arterial roads (1%), and 9.7 lane miles of principal arterial roads (15%). Functional classifications are shown in Figure 4 on page 12.

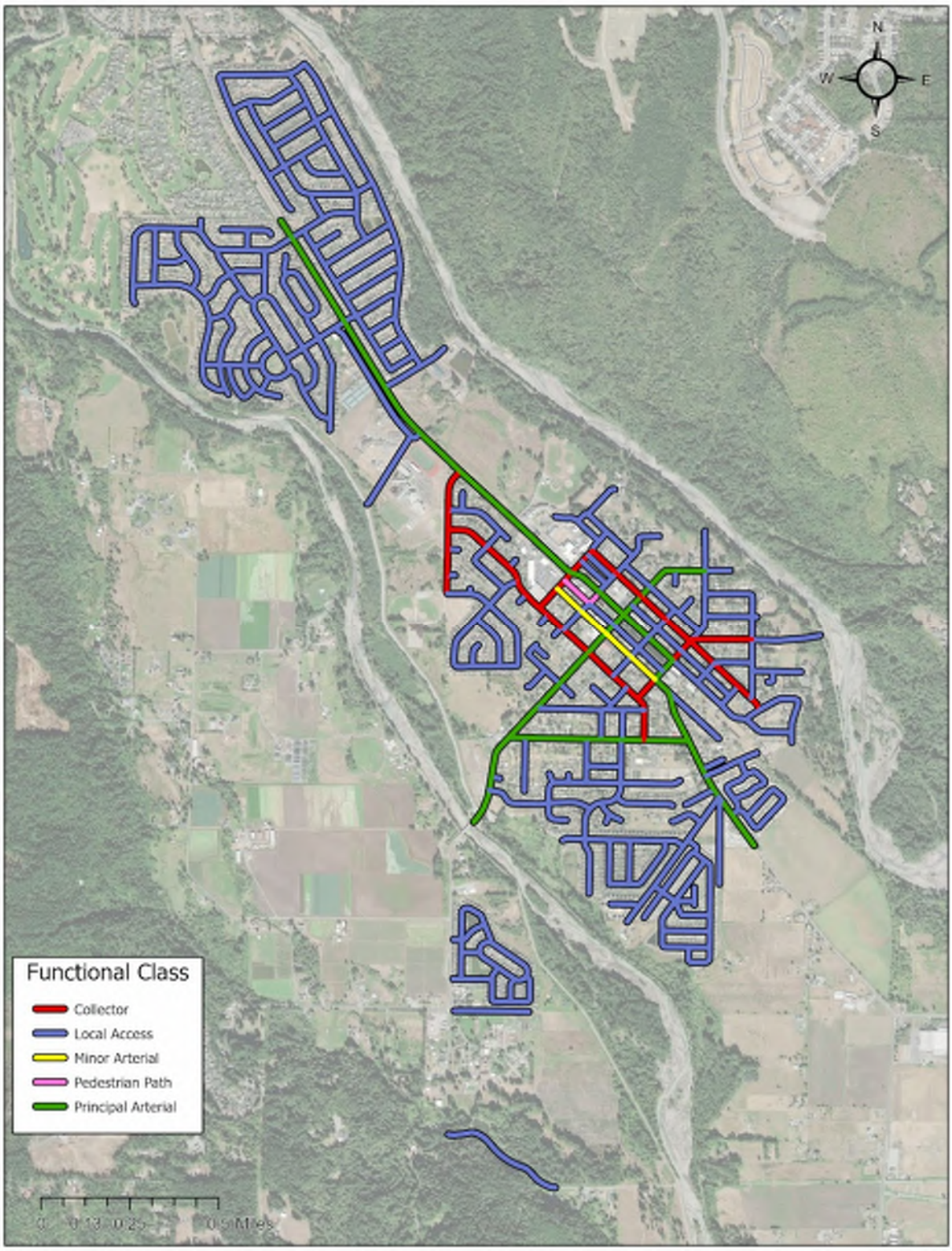

Figure 4. Roadways by Functional Classifications

3.2 GIS DATABASE

One of the priorities of the pavement evaluation was to establish a GIS database for the City of Orting so that a variety of infrastructure data could be better managed within GIS. To begin this effort, available data was pulled from Pierce County's GIS database and trimmed to Orting's city limits. This data was based on GIS nodes at intersections with links (roadways) connecting the appropriate nodes. For the purposes of the pavement condition assessment, these roadway links were further divided into segments that were approximately 250 feet in length to define manageable segments of roadway for the observation of the pavement condition. In general, these segments were recombined to be consistent with the GIS segments pulled from the Pierce County database. Exceptions were made based on significant differences in distresses present.

4. PAVEMENT CONDITION FIELD ASSESSMENT

4.1 INTRODUCTION

The first step in the development of a pavement management system is to inventory the existing roadway system to establish a baseline of the condition in time. From this assessment, a PMS can be developed based on field-collected data. It also sets a precedent by which the PMS can be updated and expanded as future pavement condition assessments are conducted.

This section covers the methods, distresses, segment evaluation, and overall rating process used in the pavement condition assessment. This section of the report includes excerpts from the PSCFRM that were expanded to describe each observable distress, along with photographs from the field and maps of where each of the distresses were present in Orting. This is intended to facilitate an understanding of the pavement condition assessment and provide consistent review data for future pavement condition assessments.

4.2 PAVEMENT CONDITION ASSESSMENT METHODOLOGY

4.2.1 Asphalt Concrete Paved Roadways

This pavement condition assessment followed NWPMA's PSCFRM (Manual) methodology as recommended by WSDOT. The Manual describes potential asphalt concrete pavement distresses, listed in Chapter 4.3, and recommends methods of qualitative and quantitative assessment based on both severity and extent. The PSCFRM lays out two options to qualify these severities and extents. Option A used the worst assigned severity and the total extent of the distress while Option B assigned the extent of each severity individually. For the purposes of this assessment, Option A was always used.

The Manual also discusses best practices for evaluating the roadways. These evaluations were done on foot, or in Phase 2, confirmed while on foot, and they were conducted by a 2-person team over a 2-month period. The observation team recorded the pavement condition for each segment defined in the GIS. Pavement condition overall ratings covered the whole traveled surface of the roadway, not an individual lane or direction of travel. Observed distresses and data that captured the severity and frequency of each distress were entered electronically in a proprietary SCJ software that was developed based on this manual and the use of GIS (see Appendix B).

Due to variability in site conditions or assessors, it is critical to have continuity between both the time of the assessment and assessors, and to collect the data within the same range of time and using the same methodology. The Orting Pavement Condition Assessment covered roadways within Orting's city limits and took place in September and October 2022, in three independent phases conducted by the same 2-person team of engineers. Summer weather conditions were observed in all field visits.

The first phase of three covered principal arterials, minor arterials, and collector streets, as well as some central local access roads with the exception of SR 162, which is maintained by the WSDOT. The second phase covered the remaining local access roads and the third phase covered SR 162 through city limits. The segments observed in each phase are shown in Figure 5 on page 15.

Data collection varied from phase to phase as it was recognized that fewer pictures could cover the entire segment because the pavement condition of segments was nearly always consistent. Therefore, pictures were taken at 125' intervals in Phase 1, but then at 250' intervals in Phase 2. In Phase 3, a video was also taken to assist in the pavement condition observation because the roadway is under significant amounts of vehicular traffic.

4.2.2 Portland Cement Concrete Paved Roadways

WSDOT doesn't make a recommendation for how to assess the condition of PCC roadways, and no equivalent manual exists. Therefore, PCC roadways were evaluated using the PSCFRM distresses and the same methodology because rigid pavement surfaces such as PCC will exhibit similar failure characteristics as flexible, ACP.

4.2.3 Gravel Roadways

Gravel roadways were qualitatively field rated without PSCFRM distress observations or evaluation. Access, maintenance, and service all factor into roadway surface construction materials, gravel while not excluded from the report, is not included in the PSCFRM.

4.2.4 Private Access Roadways

Private access roadways were encountered in gated communities where vehicular access is restricted to property owners only. Each segment of private access roadway was evaluated where possible without disturbing private occupants and photographs only taken on the public portion of these segments.

Majestic View Estates is a private access, gated community located on the southern part of town. With the restricted access, no field assessment was made, and no GIS data collected. If these roadways are maintained by the City, future pavement condition assessments should be performed with coordinated access to these communities.

4.2.5 Pedestrian Paths

Three segments consisting solely of pedestrian path were included as part of the assessment and given qualitative ratings using PSCFRM as a basis of assessment.

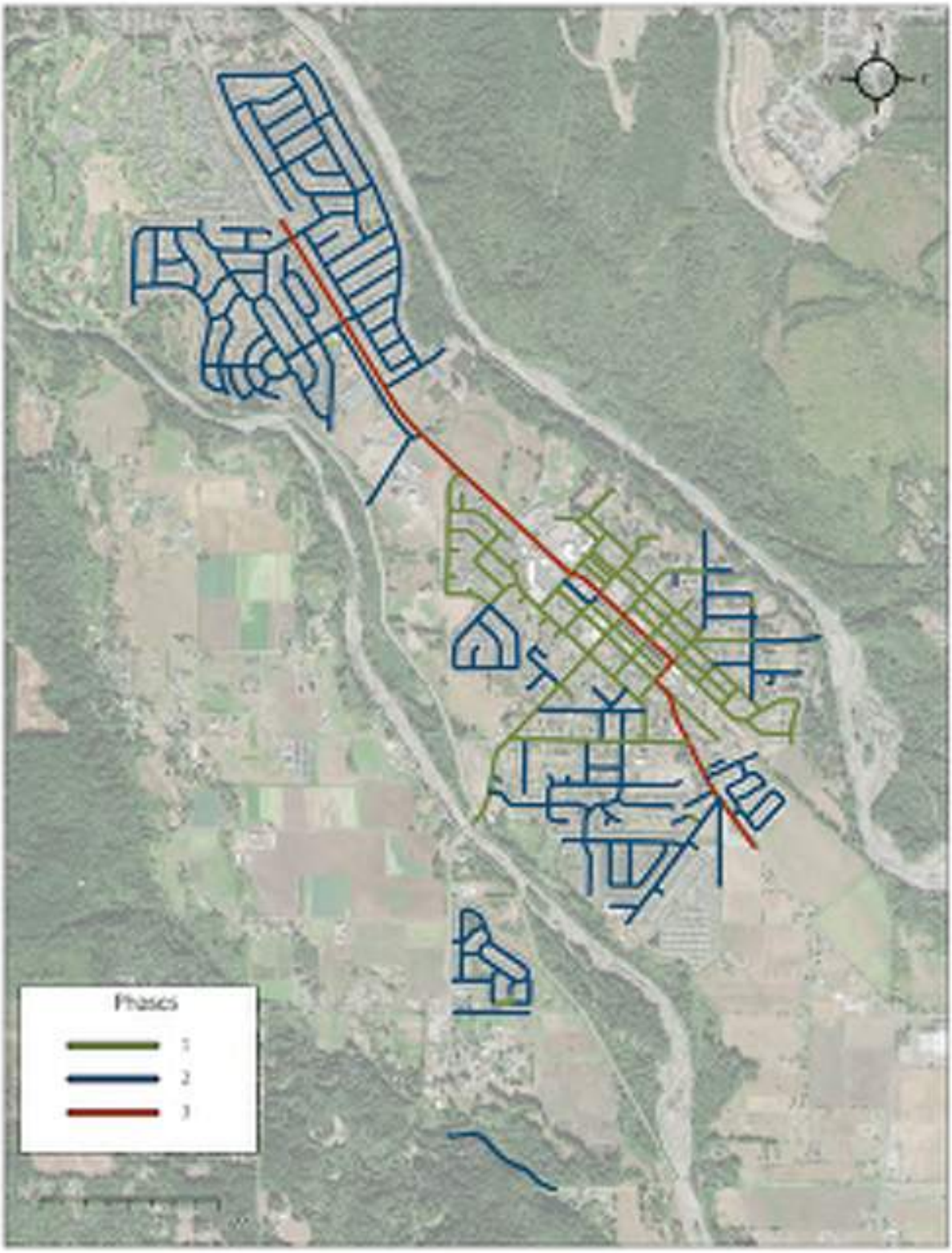

Figure 5. Roadways Assessed in Each Phase of Evaluation

4.3 PAVEMENT CONDITION ASSESSMENT

The distresses that were evaluated in this pavement condition assessment come direction from the PSCFRM. Two distress types were included in the assessment but were not observed as noted below.

1. Rutting
2. Alligator Cracking
3. Longitudinal Wheel Path Cracking
4. Longitudinal Non-wheel Path Cracking
5. Transverse Cracking
6. Raveling and Aging
7. Flushing and Bleeding
8. Patching
9. Corrugation and Waves (not observed)
10. Sags and Humps
11. Block Cracking (not observed)
12. Pavement Edge Condition
13. Crack Seal Condition

Each subsection below describes the distresses evaluated in this pavement condition assessment, information on how the severity and frequency was evaluated for each distress, potential causes for this type of failure, and in some cases, specific methods typically used to address these failures. Much of this information is borrow directly from the NWPMA's PSCFRM and is included here to support the baseline pavement condition assessment and subsequent pavement management planning and programming efforts. An example photo specific to the City of Orting and from this baseline pavement condition assessment has been included to indicate the potential worst case of each distress type assessed.

4.3.1 Rutting

Rutting occurs when vehicle's wheels have forced the wheel path lower than the rest of the road (seen on Kansas Street, Figure 6 on page 2). Although, it can be due to the pavement being worn off, it is generally attributed to base material being displaced. Pavement being worn off can be fixed with a repave, but if the root cause was the base material, a full reconstruction is likely needed. Figure 7 on page 3 shows the locations where rutting was observed during this pavement condition assessment.

Severity

- Low – ¼ inch to ½ inch
- Medium – ½ inch to ¾ inch
- High – over ¾ inch

Frequency

- Not measured for rutting, applied to entire segment, or defined in a comment.

Figure 6. Rutting on Kansas Street

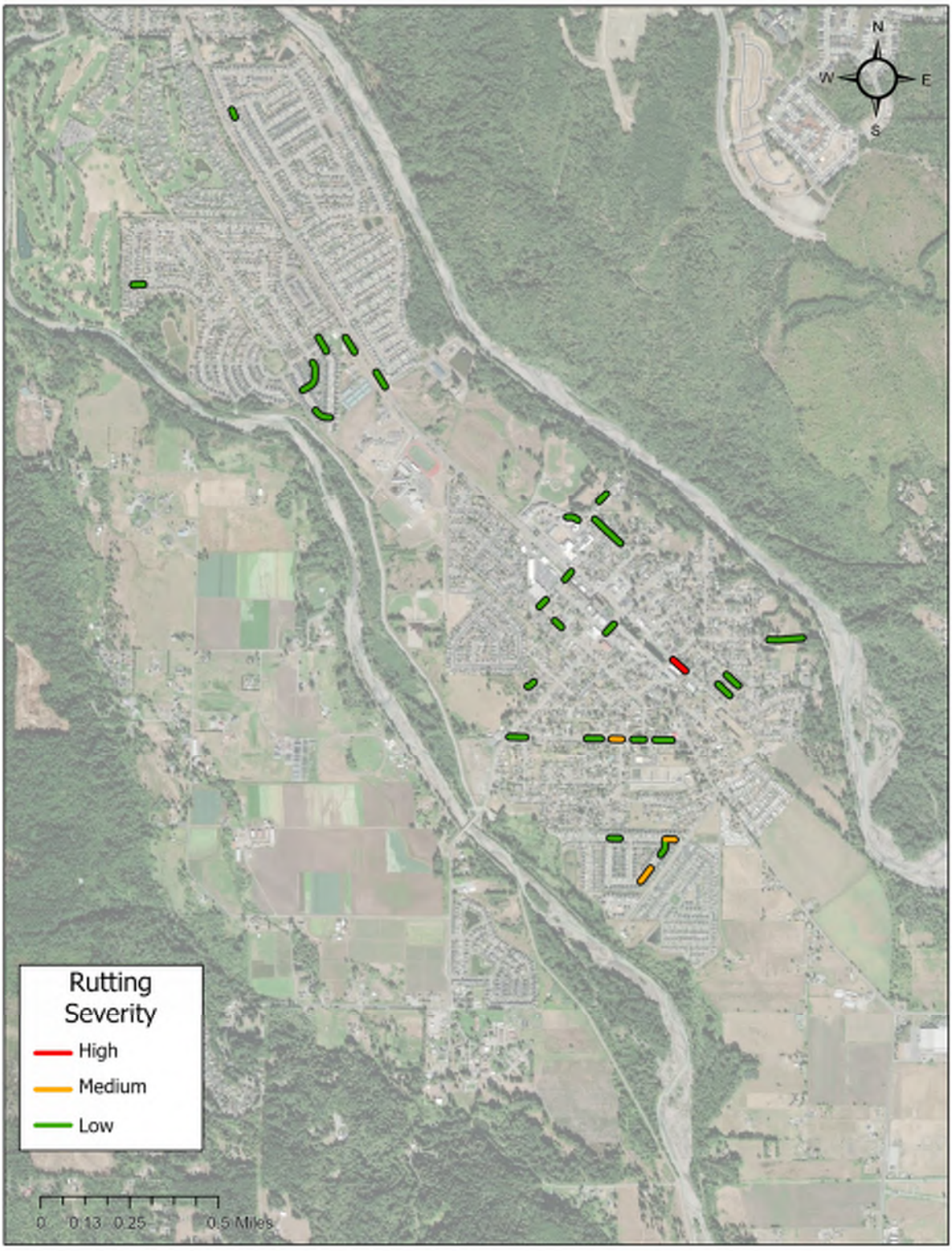

Figure 7. Rutting in Orting

4.3.2 Alligator Cracking

Alligator cracking is a distress due to wear where cracks connect extensively (see Figure 9 below). These interconnected cracks point to material beneath the pavement having settled and show the pavement is not receiving adequate support. This distress requires fixing the base materials as well as the pavement itself. Alligator cracking was mainly observed in the southern section of Orting, as seen in Figure 10 on page 6.

Severity

- Low – Branched, longitudinal, discontinuous thin cracks beginning to interconnect.
- Medium – Cracking is completely interconnected, and some spalling may appear at edge of cracks. Pavement pieces are still in place.
- High – Well developed pattern of cracking, spalling is very apparent, and pieces may be missing.

Figure 8. Alligator Cracking Severities

Frequency

- Percentage of each wheelpath affected per segment evaluated.

Figure 9. Alligator Cracking on Varner Avenue

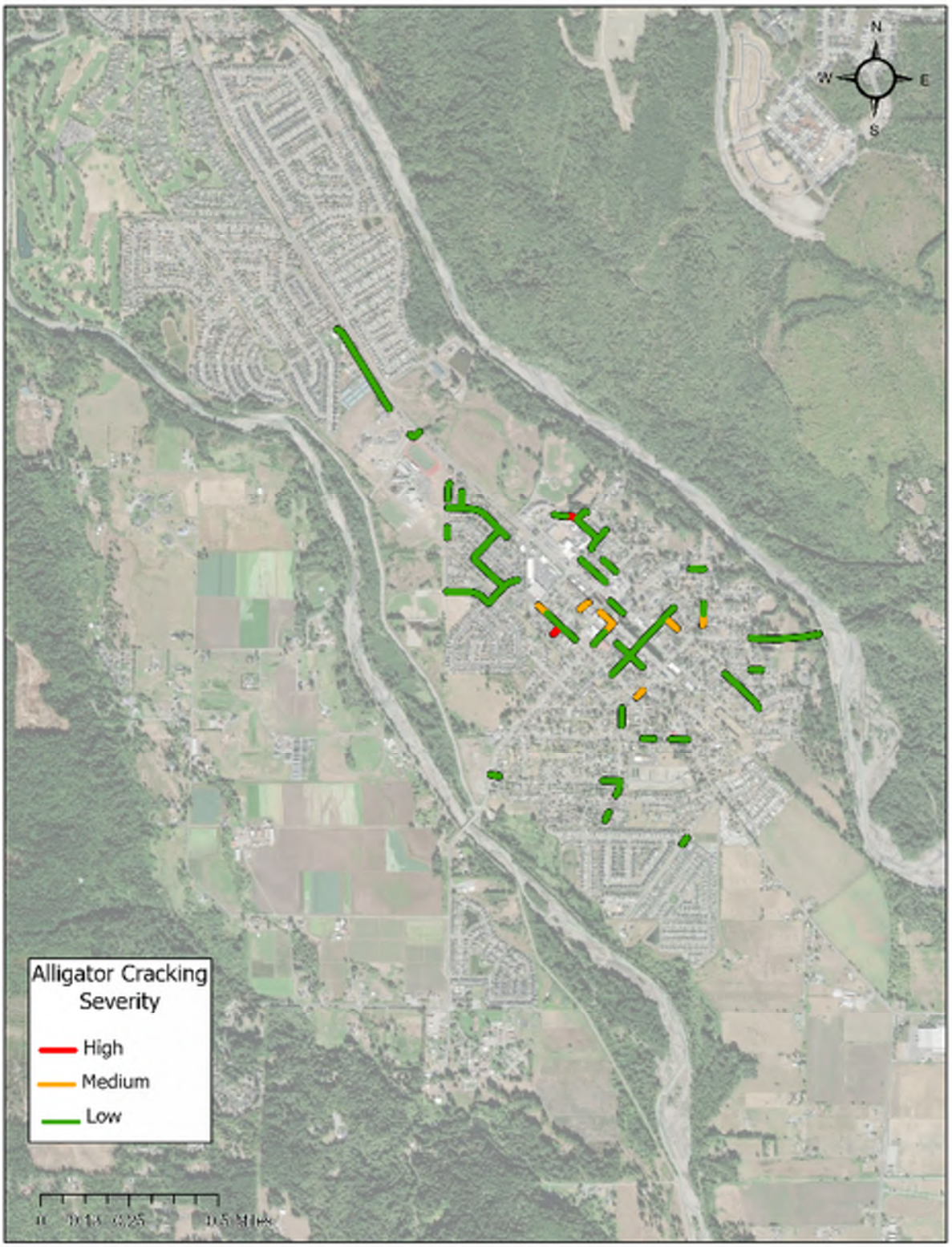

Figure 10. Alligator Cracking in Orting

4.3.3 Longitudinal Wheelpath Cracking

Longitudinal wheelpath cracks run parallel to the roadway centerline and are in the wheel path of traffic (Figure 12 below). Although it is possible that these cracks are from poor joint construction, they may also be the beginning of alligator cracks forming. Depending on the cause, the repair methods vary from crack sealing to repaving. Longitudinal wheel path cracking was only observed in Orting at low severity, as seen in Figure 13 on 9.

Severity

- Low – Cracks have very little or no spalling and are less than ¼" in width
- Medium – Cracks have little or no spalling but are greater than ¼" in width
- High – Cracks are spalled, and pieces are visibly missing

Figure 11. Longitudinal Wheelpath Cracking Severities

Frequency

- Percentage of the length of each segment evaluated.

Figure 12. Longitudinal Wheelpath Crack along Calistoga Street

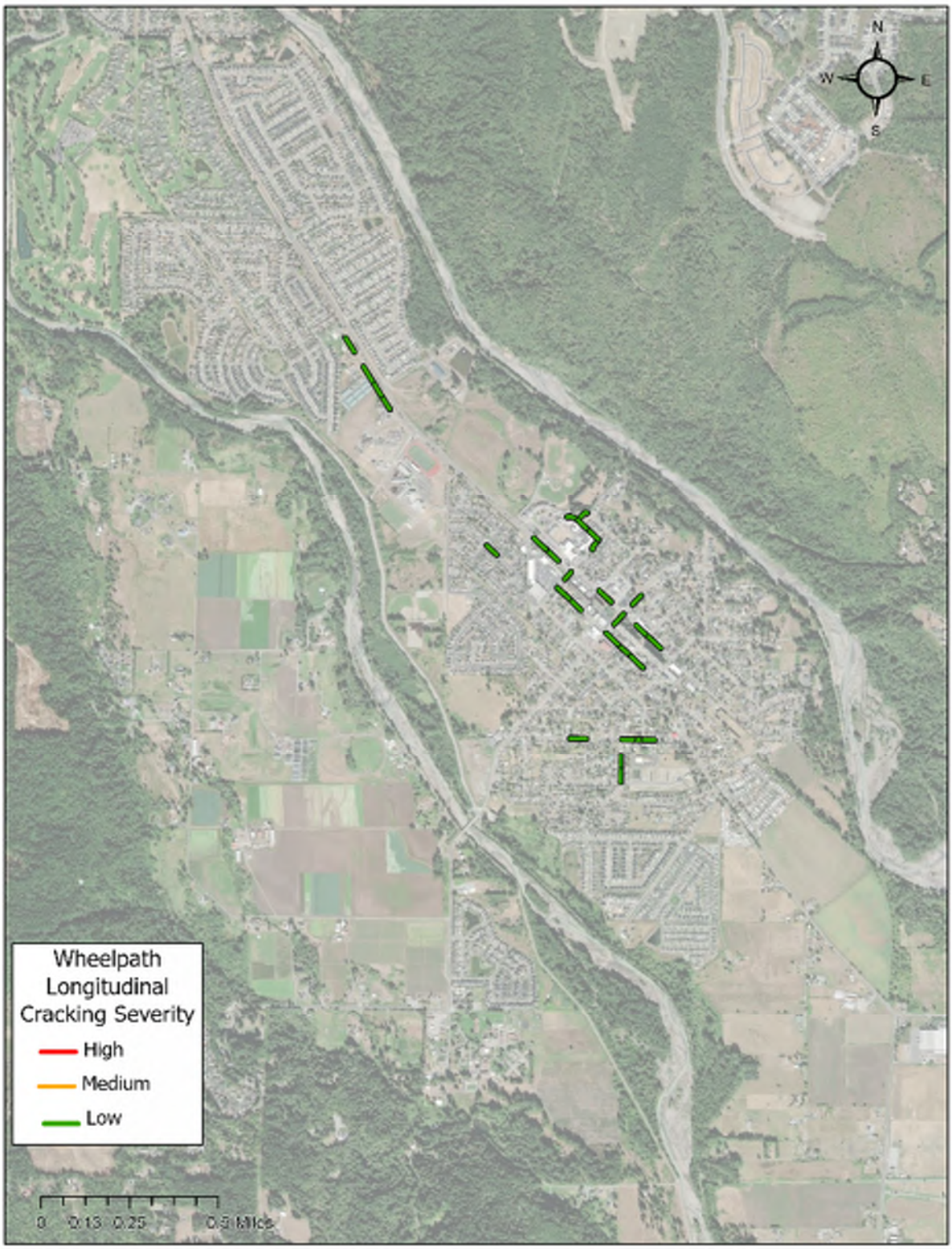

Figure 13. Longitudinal Wheelpath Cracking in Orting

4.3.4 Longitudinal Non-Wheelpath Cracking

Longitudinal non-wheelpath cracks were seen on the centerline of many of Orting's roadways (Figure 15 below). These longitudinal cracks run parallel to the roadway centerline and are not in the wheel path of traffic. They are generally caused by poor joint construction. Crack sealing may be all the maintenance required, however, a repave is needed to truly fix the crack. Figure 16 on page 12 shows this distress was often seen on long stretches of the same road, indicating it was likely due to paving methods.

Severity

- Low – Cracks have very little or no spalling and are less than ¼" in width
- Medium – Cracks have little or no spalling but are greater than ¼" in width
- High – Cracks are spalled and pieces are visibly missing

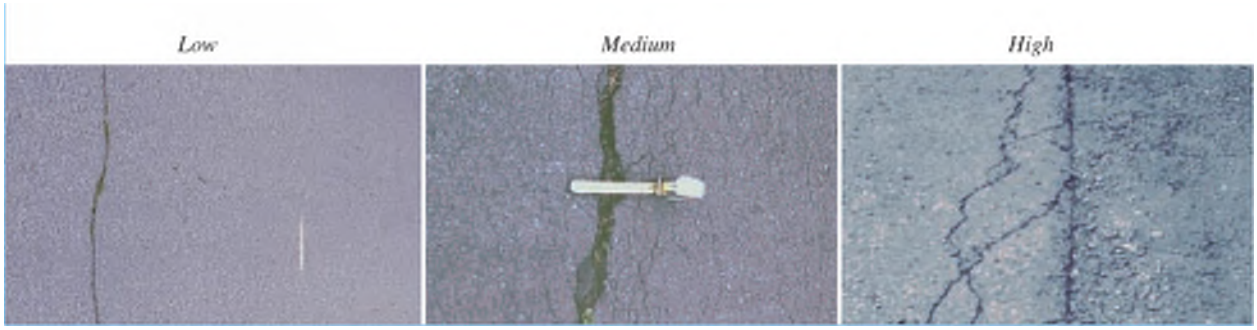

Figure 14. Longitudinal Non-Wheelpath Cracking Severities

Frequency

- Percentage of the length of each segment evaluated.

Figure 15. Longitudinal Non-Wheelpath Cracking along Bridge Street

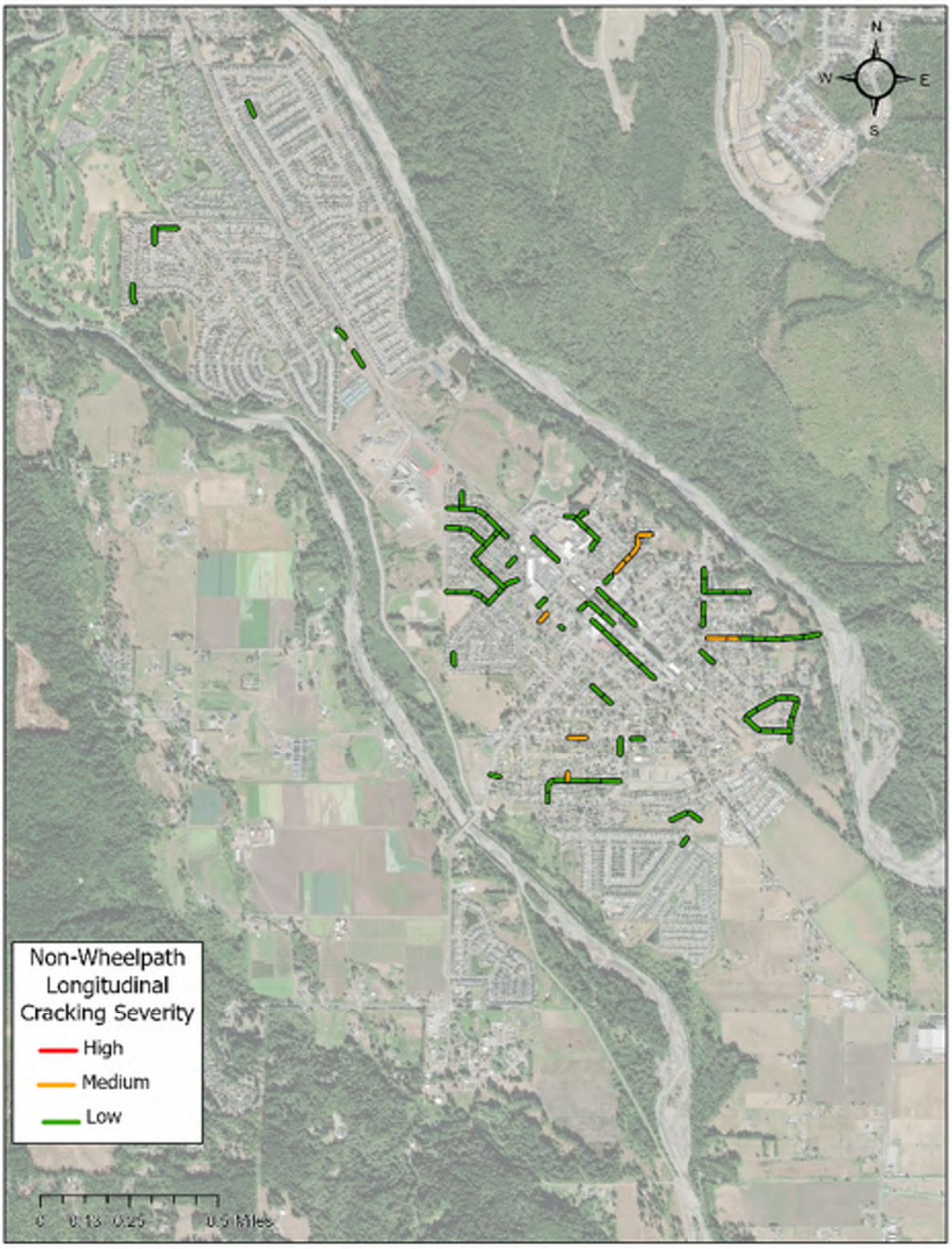

Figure 16. Longitudinal Non-Wheelpath Cracking in Orting

4.3.5 Transverse Cracking

Transverse cracks run perpendicular to the roadway centerline (Figure 18 below). These can be caused by pavement shrinkage at low temperatures, by binder hardening, or by the joints between concrete slabs when pavement is placed on top of concrete. Crack sealing will prevent water infiltration, but to fix the cracks, a repave may be required. Figure 19 on page 15 shows prominent transverse cracking along Washington Ave.

Severity

- Low – Cracks have very little or no spalling and are less than ¼" in width
- Medium – Cracks have little or no spalling but are greater than ¼" in width
- High – Cracks are spalled and pieces are visibly missing

Figure 17. Transverse Cracking Severities

Frequency

- Count of cracks observed per 100-foot section.

Figure 18. Transverse Cracks on Belfair Avenue

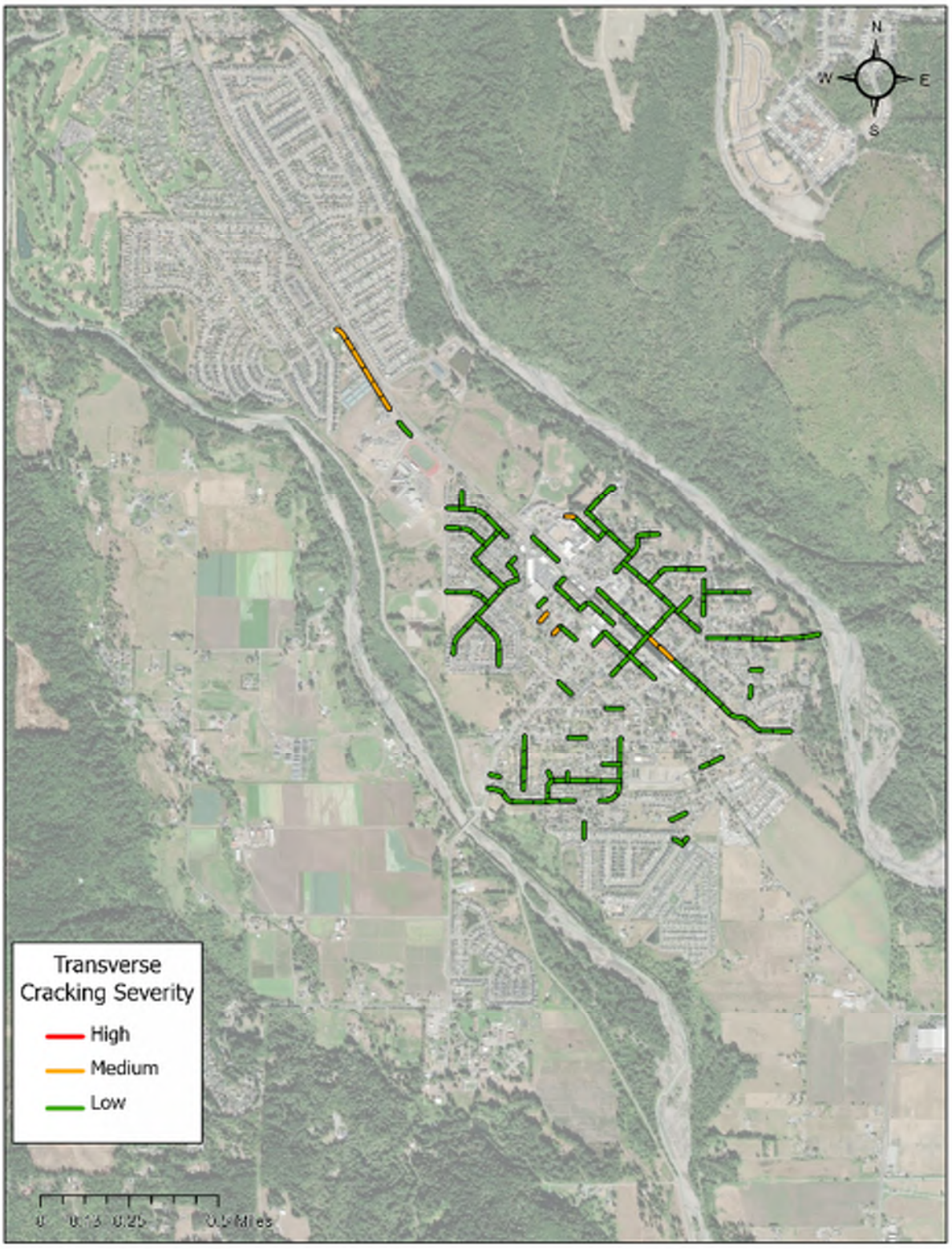

Figure 19. Transverse Cracking in Orting

4.3.6 Raveling and Aging

Raveling and aging can be seen when the roadway looks rough and worn (Figure 21 below). Aging specifically presents itself in the discoloration of a pavement surface and can be present without raveling. Aging is the indication of the beginnings of roadway failure. Raveling happens as aging pavement begins to see the aggregate separating, or the aggregate is no longer present in the pavement. Aging and Raveling are not indicative of any subbase failure. Pavement life and easily be resources or extended by chipseal or other maintenance activities prior to failure. Raveling and aging is the most common distress found during the assessment, as shown in Figure 22 on page 18.

Severity

- Low – Aggregate and/or binder has started to wear away.
- Medium – Aggregate and/or binder has worn away and the surface texture is rough and pitted.
- High – Aggregate and/or binder has worn away significantly and the surface texture is deeply pitted and very rough.

Figure 20. Raveling and Aging Severities

Frequency

- Extent of raveling observed is either localized, confined to the wheelpath, or across the entire lane.

Figure 21. Raveling and Aging along Corrin Avenue

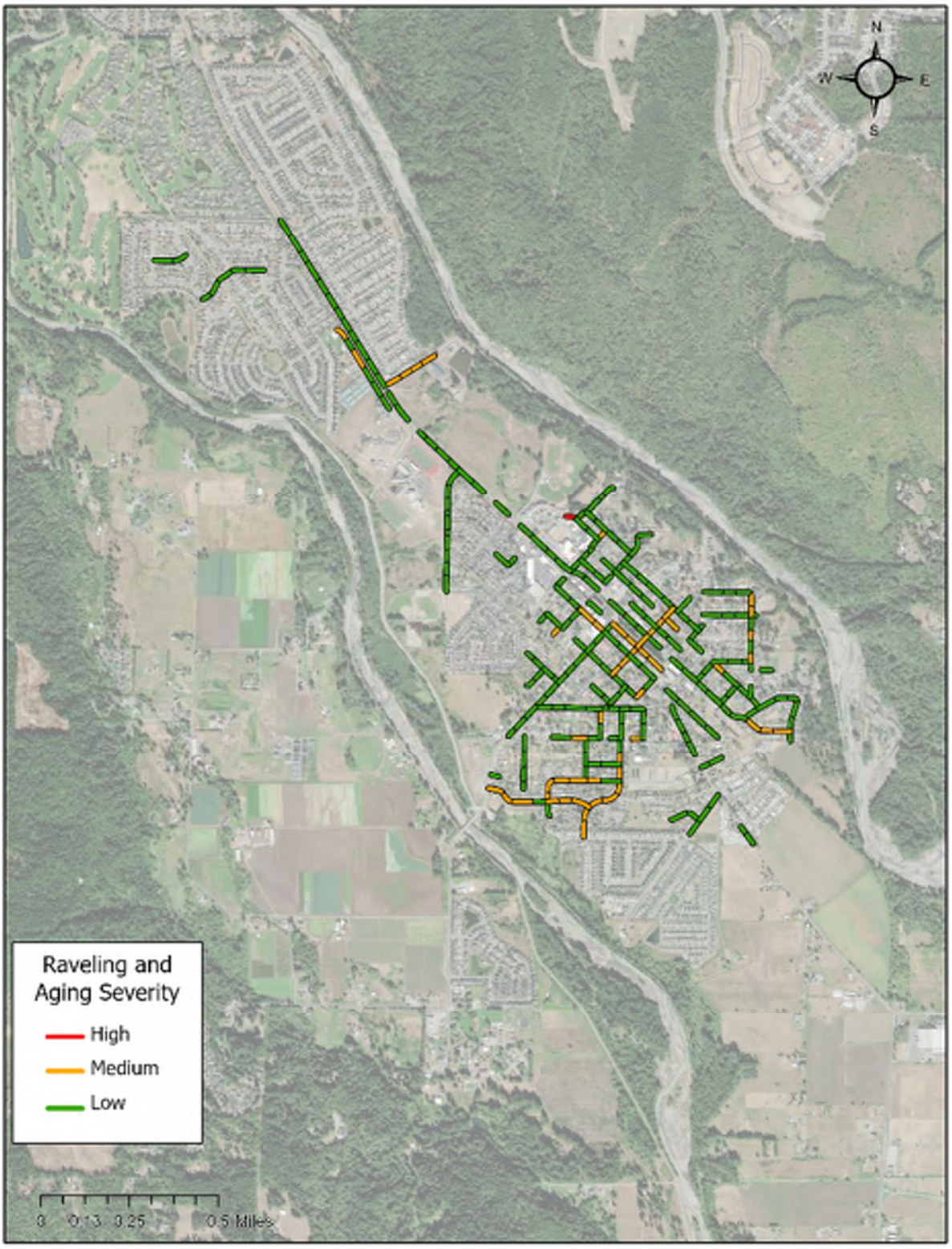

Figure 22. Raveling and Aging in Orting

4.3.7 Flushing and Bleeding

Flushing and bleeding look shiny on colder days and can approach a gooey look on hot days (cold day, ~60 degrees, shown in Figure 24 below). It occurs when there is excess binder in the pavement, causing it to bleed to the surface. Chip seals often lead to this condition as they get older. This distress can be halted by applying sand to soak up excess binder, but it likely needs a repave or slurry seal to permanently fix. Flushing and bleeding in Orting were assessed on limited segments of long of roads and are particularly indicative of a poor binder mix during asphalt roadway construction or asphalt roadway construction during weather elements that negatively impact curing of these binders. (Figure 25 on page 21).

Severity

- Low – Minor amounts of aggregate covered by excess asphalt
- Medium – Significant amount of the aggregate covered by excessive asphalt
- High – Most of the aggregate is covered by excessive asphalt

Figure 23. Flushing and Bleeding Severities

Frequency

- Extent of flushing observed is either localized, confined to the wheelpath, or across the entire lane.

Figure 24. Flushing and Bleeding on Park Place

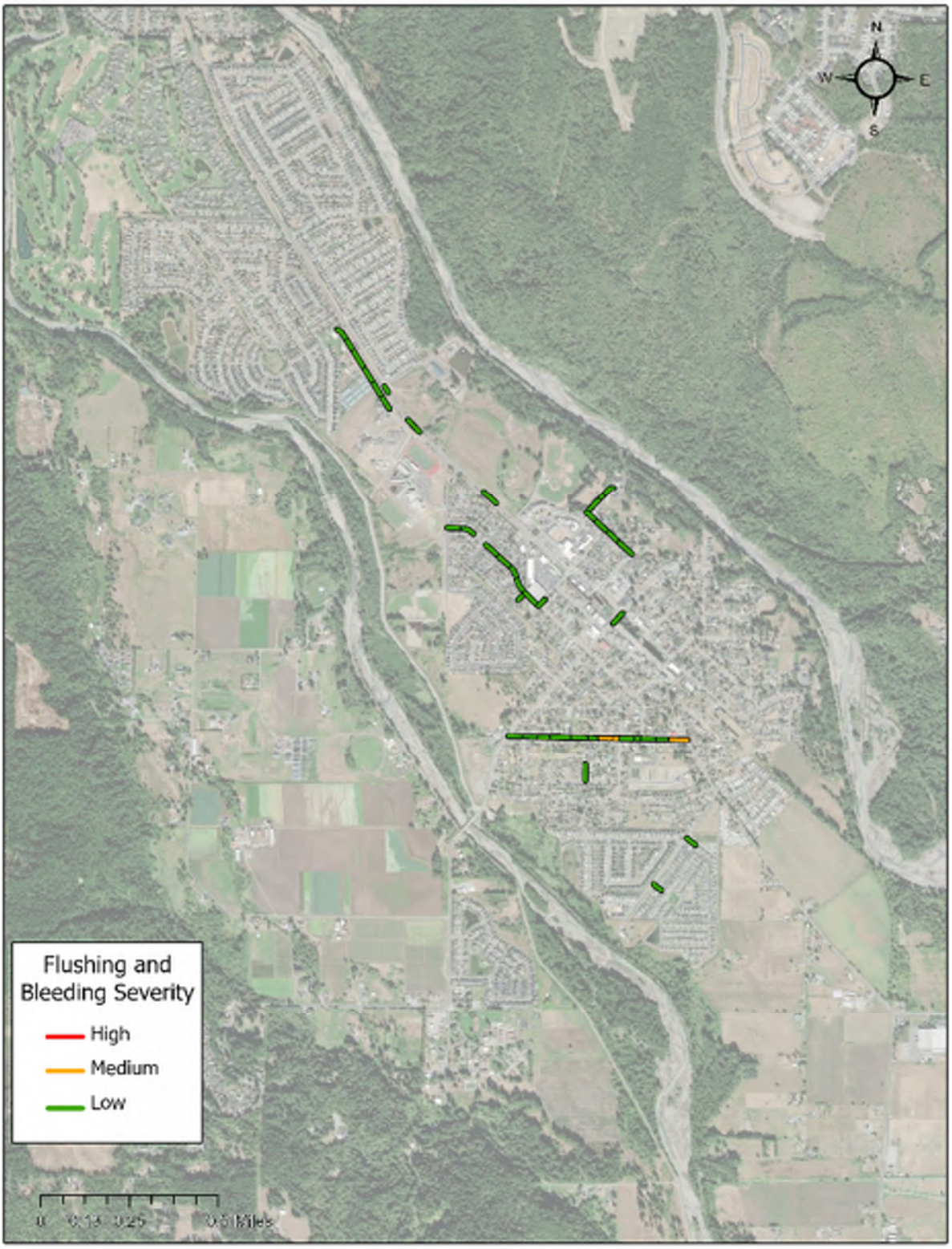

Figure 25. Flushing and Bleeding in Orting

4.3.8 Patching

Roadway patches occur anywhere the original construction of pavement has been cut into (Figure 27 below). Patching is a result of various activities. Patching can be the result of a utility repair below the roadway surface. Patching can occur to repair a failed portion of the roadway either a pothole or excessive cracking that affects a limited section of an otherwise good roadway. Patching can occur to address subgrade failures on the edges of pavement where the roadway width has been compromised. The assessment found a low frequency of patching and a high rate of patching success where patches are present. Patches failed are assessed by the type of failure present within the roadway segment and considered high severity if the patch has otherwise failed. No conditions of severe patching were assessed in the city of Orting. (Figure 28 on page 24).

Severity

- Low – Patch has at most low severity distress of any type.
- Medium – Patch has at most medium severity distress of any type.
- High – Patch has at most high severity distress of any type.

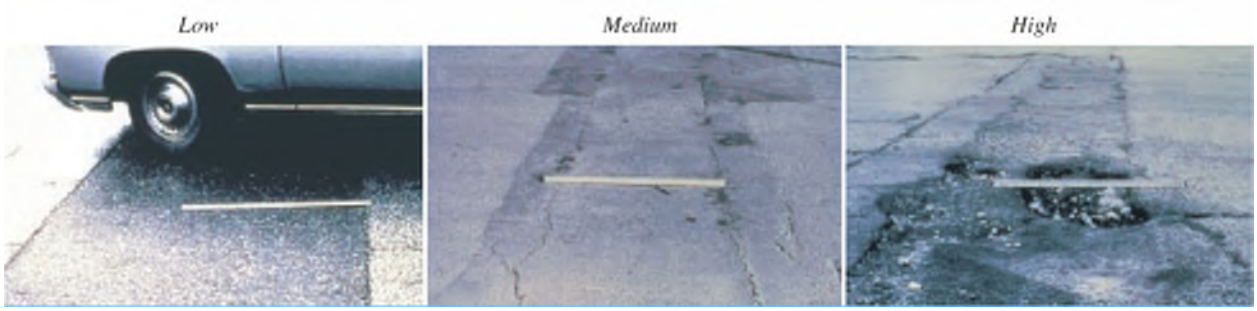

Figure 26. Patching Severities

Frequency

- Percentage of each wheelpath affected.

Figure 27. Patching on Bridge Street

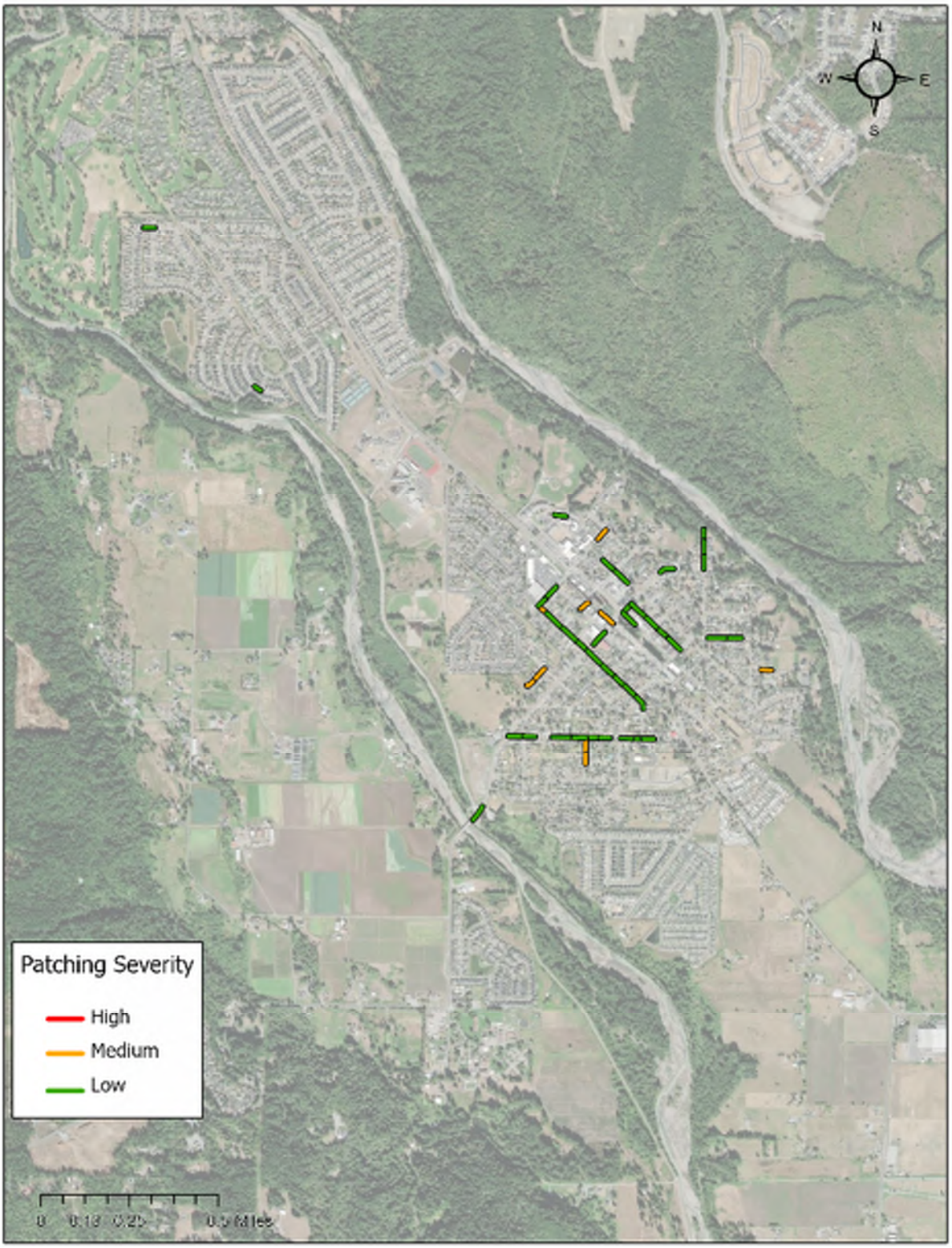

Figure 28. Patching in Orting

4.3.9 Corrugation and Waves

This distress was not significant, although a few cases were noted, in the baseline pavement condition assessment performed for Orting.

Severity

- Low – ½ inch to 2 inches per 10 feet.
- Medium – 2 inches to 4 inches per 10 feet.
- High – Over 4 inches per 10 feet.

Frequency

- Extent of corrugations measured in square feet.

[redacted] Sags and Humps

Sags and humps are localized low or high points in a roadway respectively (see sags in Figure 29 below). These may result from settlement, tree roots, pavement shoving, or subgrade swelling. Patching should fix this condition if it is localized while a repave may be more appropriate if an entire roadway sags and humps. Sags and humps of medium and high severity were present on the lowest rated roads in this assessment, Old Pioneer Way, and Kansas Street (Figure 30 on page 27).

Severity

- Low – ½ inch to 2 inches per 10 feet.
- Medium – 2 inches to 4 inches per 10 feet.
- High – Over 4 inches per 10 feet.

Frequency

- Percentage of the lane-area affected.

Figure 29. Sags along Hays Avenue

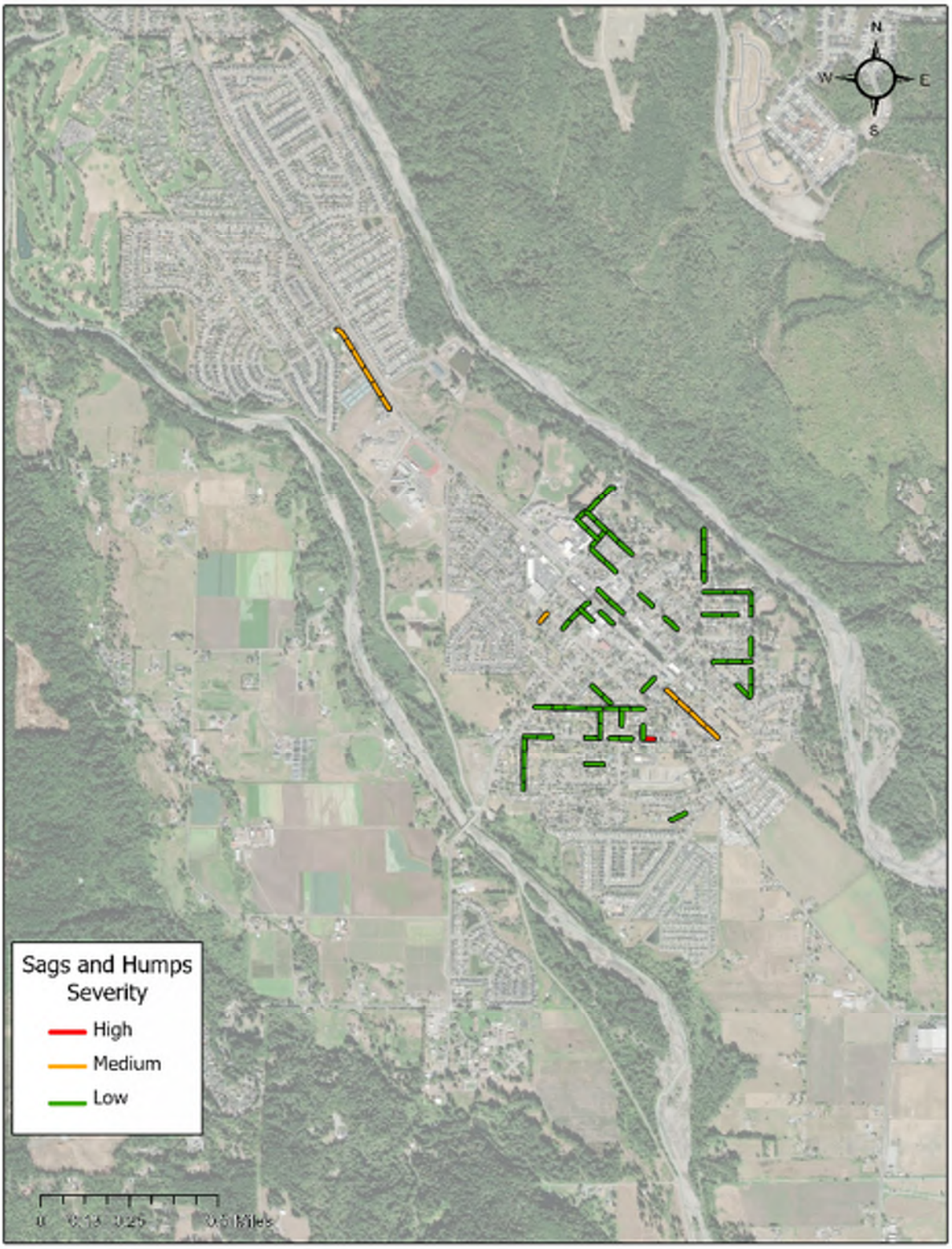

Figure 30. Sags and Humps in Orting

4.3.11 Block Cracking

This distress was not significant, although a few cases were noted, in the baseline pavement condition assessment performed for Orting.

Severity – Block Size

- Low – 9 x 9 feet or greater.
- Medium – 5 x 5 feet to 8 x 8 feet blocks.
- High – 4 x 4 feet blocks or less.

Severity – Crack Size

- Low – Less than ¼ inch.
- Medium – Over ¼ inch.
- High – Spalled.

Frequency

- Not measured for rutting, applied to entire segment.

[redacted] Pavement Edge Condition

Low severity edge condition, or edge raveling, is common and often occurs near gravel driveways as seen in Figure 31 below. It can lead to more severe edge conditions, such as potholes, or very severe conditions where the travel lane is effectively less than 10 feet wide. Treatment for edge raveling and potholing includes patching or half road patching depending on the severity of the patch. Edge conditions were mainly present in a low severity case, but also has some medium severity segments and one high severity segment, as seen in Figure 32 on page 30.

Severity – Crack Size

- Low – Edge Raveling.
- Medium – Edge Patching.
- High – Edge lane less than 10 feet.

Frequency

- Percentage of the length of each segment evaluated.

Figure 31. Edge Raveling on Olive Street

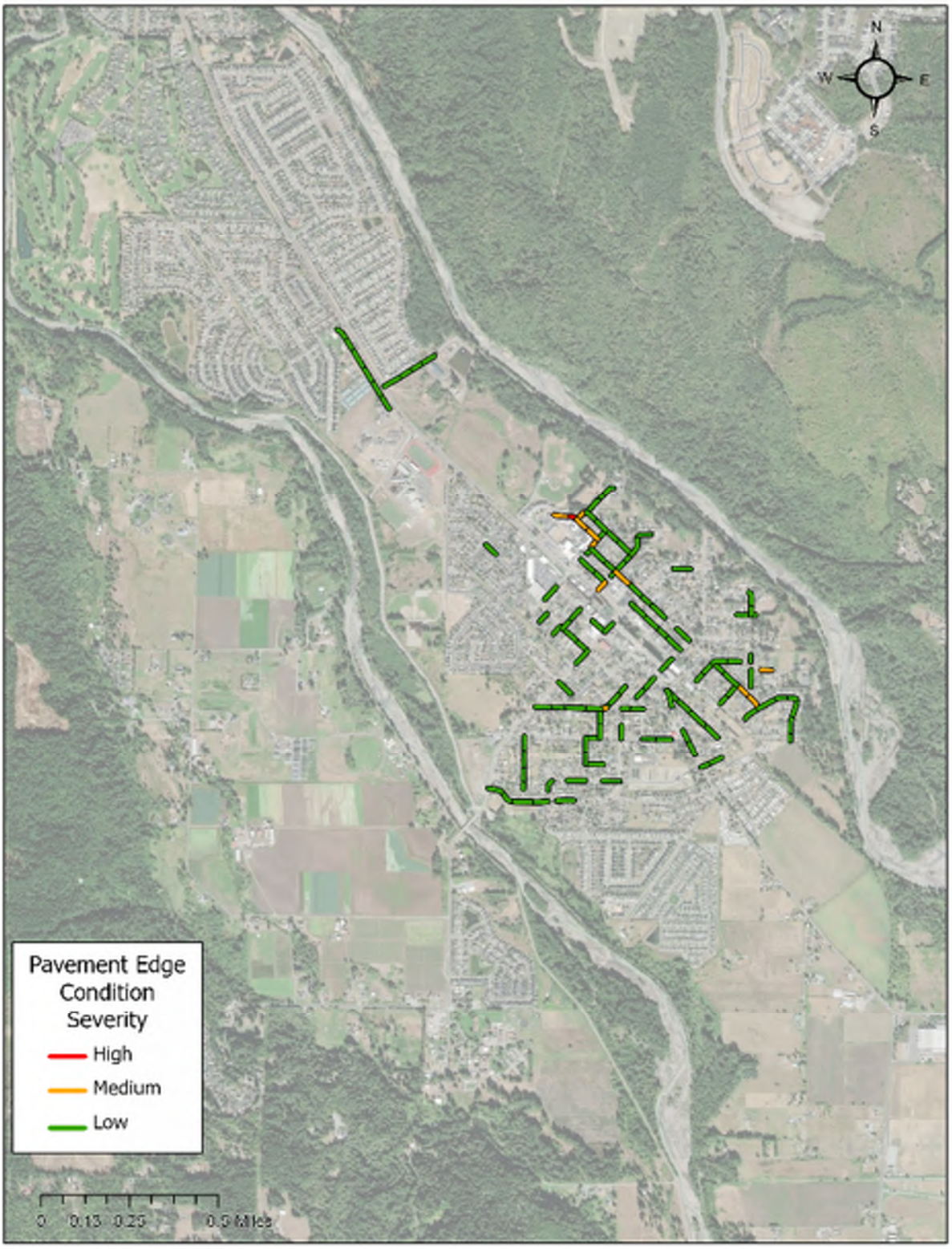

Figure 32. Edge Conditions in Orting

Crack Seal Condition

Crack sealing is a valuable maintenance method for cracks as it limits water infiltrating the base material (see Figure 33 below). This, in turn, delays or prohibits the expensive maintenance methods aimed at fixing the base levels. It is important to know where cracks are present that have not been sealed, so the final condition rated the extent of crack sealing and if there were any new cracks forming through the seal. Figure 34 on page 32 shows all the locations crack sealing was observed in Orting.

Figure 33. Crack Seal down Silvernail Street

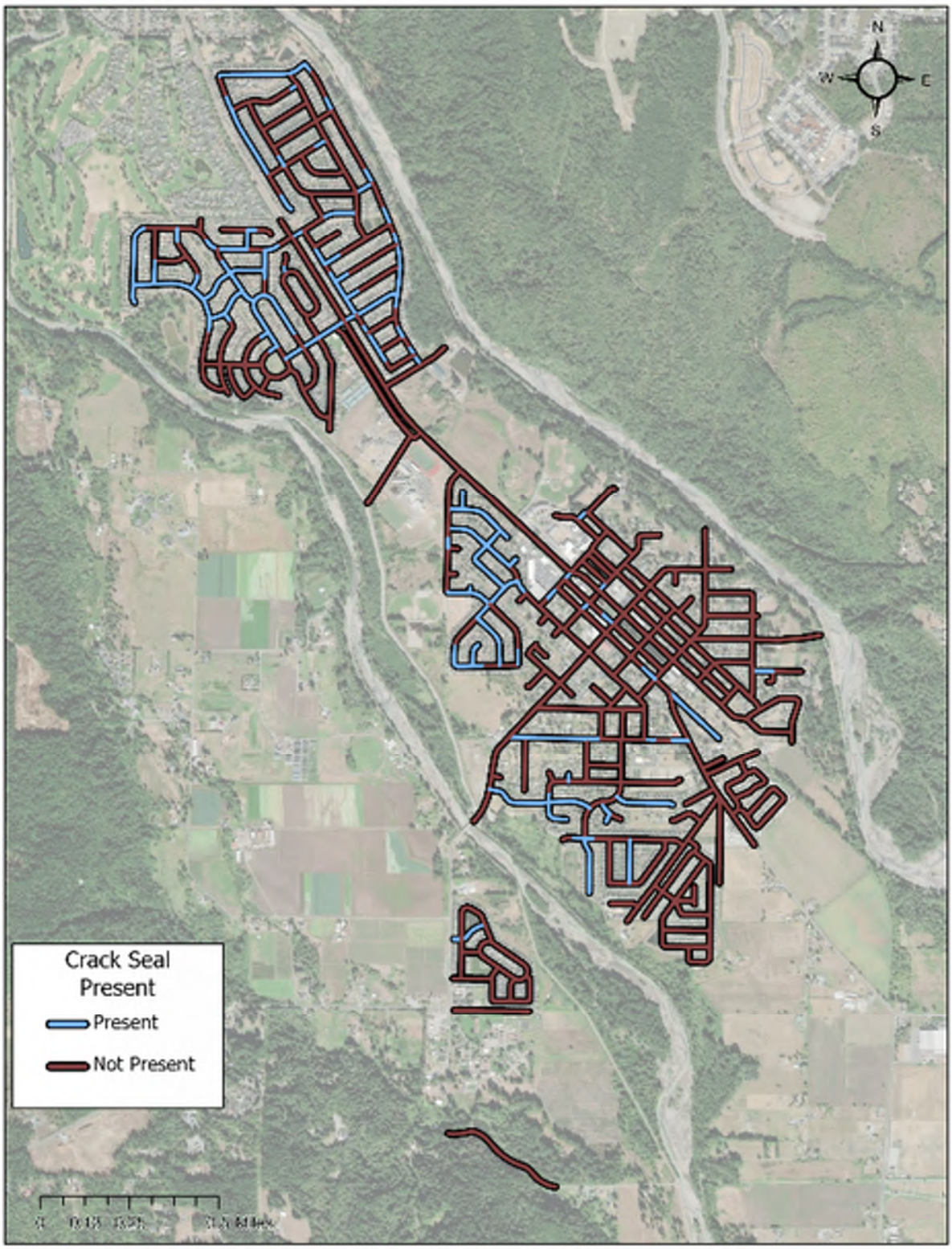

Figure 34. Crack Sealing in Orting

5. OVERALL PAVEMENT CONDITION RATINGS

5.1 INTRODUCTION

In order to compare and prioritize segments for inclusion in the City's pavement management system, it is helpful to have an overall rating of the pavement condition for each segment. With this data, segments can be prioritized for both maintenance and preservation actions and a plan to address them can be developed considering all segments, even though they experience different issues that, at times, have different solutions. This section describes how the overall rating was assigned for each segment and summarizes the condition of the city's roadway network.

5.2 OVERALL PAVEMENT CONDITION RATINGS METHODOLOGY

Based on the cumulative presence or lack-of, the distresses discussed in Section 4 and the severity and frequency of these distresses, we developed a weighted grading of pavement condition. This section describes how the overall rating was determined.

We collected field data for each segment and applied a rating scale based on the distresses found:

Not present (0); Low (1); Medium (2); High (3)

These severities are based on conditions specific to the distress type present, e.g., alligator cracking is rated based on the width of cracks and severity of roadway spalling, 0 being no alligator cracking and 3 being roadway spalling or large intrusive cracking. See individual distress sections for these rating metrics.

We then included a weighting factor on the significance of the distress type:

Alligator Cracking, Rutting (5)

Raveling and Aging, Corrugation and Waves (4)

Block Cracking, Longitudinal Wheel Path Cracking, Transverse Cracking, Crack Seal Condition, Flushing and Bleeding (3)

Patching, Sags and Humps (2)

Pavement Edge Condition, Longitudinal Non-wheel Path Cracking (1)

We included another factor based on the volume of the distress type included:

0 – 10%, 1-4, etc. (1)

11-25%, 4-9, etc. (1.2)

25%+, 10+, etc. (1.5)

The purpose of these modification factors is to quantify the distresses in each segment in a way that allows them to be compared to like segments and compare typical distresses found. From these quantitative ratings, a qualitative rating of Like New, Good, Average, or Poor was determined. This overall rating will help us compare the segments to each other if different types of distresses are present so that we can prioritize maintenance and preservation activities to include in the multi-year pavement management program. A full list of roadway segments, along with their field pavement condition ratings, has been included in Appendix C and is also shown in Figure 2 on page 8.

5.3 Summary of Overall Pavement Condition Ratings

Figure 1 on page 7 shows the overall pavement condition ratings summarized by each roadway's functional classification. This summary shows that 7% of the lane-miles are rated poor, 24% are rated average, 33% are rated good and the last 36% are rated like new (consolidated in Figure 35 below). As these figures demonstrate, the majority of the city's roadway network is in good or new condition and likely does not need any pavement preservation and/or maintenance work at this time.

Approximately 24% of the remaining 31% roadway segments are rated in average condition and would likely benefit from pavement preservation and/or maintenance work to their usable life. Only 7% of the city's network is rated in poor condition which would require more extensive reconstruction or replacement work. The most significant of the poor segments were along Kansas Street, which is a principal arterial south of downtown. This roadway was observed being used by commercial trucks to bypass downtown and the frequent high loads have deteriorated the pavement to a poor condition. At the time of assessment, a planned reconstruction of Kansas Street is scheduled for 2024.

The other, notably poor roadway is Old Pioneer Way, which is a local access road that starts at State Route 162 (SR 162) and runs parallel for several blocks and dead-ends before reaching Lane Blvd. NW. There were both commercial and residential developments along this roadway and it is a much lower traffic roadway than Kansas Street. These two roads, combined with a few other sporadic segments, make up the roughly 7% of roads in Orting with a poor condition.

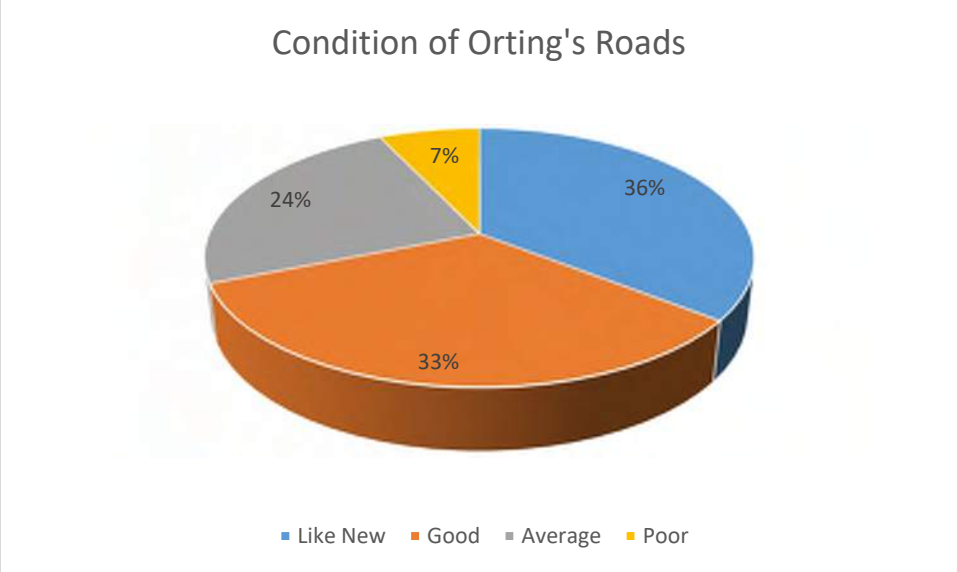

Figure 35. The Majority of Orting's Roadways are in a Good or Like New Condition

6. NEXT STEPS

The next step in the development of the city's Pavement Management System is to prioritize the poor and average sections and identify a list of projects to the programmed annually so that the City can pursue funding for this work. This will be done by considering the overall pavement condition ratings and functional classifications along with other considerations to prioritize each segment and then packaging like work into phases of pavement preservation and maintenance activities. A separate PMS report will include this work.

APPENDIX B
REFERENCES

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APPENDIX C
PRESERVATION TREATMENT UNIT COSTS

FINAL UNIT CONSTRUCTION COSTS

Crack Seal	$2.30	per lf of lane	$12,144	cost per lane mile
Chip Seal	$12.20	per lf of lane	$64,416	cost per lane mile
Mill and Fill	$44.80	per lf of lane	$236,544	cost per lane mile
Reconstruction	$142.10	per lf of lane	$750,288	cost per lane mile

LEGEND

	from uba
	calculation
	user input

Crack Seal		**Chip Seal**		**Mill and Fill (grind and overlay)**		**Reconstruction**	
$4.63	per lf	$10.00	per sy	$36.65	per sy	$116.25	per sy
8%	mobilization		All inclusive cost per prior research and	10%	mobilization	10%	mobilization
$0.33	per lf, mobilization		confirmed with WSDOT UBA	$3.33	per sy, mobilization	$10.57	per sy, mobilization
$4.10	per lf, crack seal			$11.50	per sy, planing bituminous pavement	$45.20	per cy, roadway excavation incl. haul
5%	% of construction cost for traffic control			$175.00	per ton, HMA CL. 1/2 IN. PG 58H-22	15	depth (in)
$0.21	per lf, traffic control			$358.75	per cy, HMA CL. 1/2 IN. PG 58H-22	$18.83	per sy, roadway excavation incl. haul
				2	depth (in)	$41.58	per ton, csbc
				$19.93	per sy, HMA CL. 1/2 IN. PG 58H-22	$76.92	per cy, csbc
				6%	% of construction cost for traffic control	9	depth (in)
				$1.89	per sy, traffic control	$19.23	per sy, csbc
						$175	per ton, HMA CL. 1/2 IN. PG 58H-22
						$358.75	per cy, HMA CL. 1/2 IN. PG 58H-22
						6	depth (in)
						$59.79	per sy, HMA CL. 1/2 IN. PG 58H-22
						8%	% of construction cost for traffic control
						$7.83	per sy, traffic control

Adjusting costs to lane width per LF

11 lf wide lane (average)				assumes 6" HMA on 9" CSTC
1 lf of lane length	9.0 sy/sf	9.0 sy/sf	9.0 sy/sf	
	$12.20 per lf of lane	**$44.80 per lf of lane**	**$142.10 per lf of lane**	

Assume, on average, cracking runs 1x the length of the lane

0.5 lf crack per length of lane

$2.30 per lf of lane

APPENDIX D
PROGRAM COSTS

Workplan Table

RECONSTRUCTION PROJECT	Construction Cost (in 2023 dollars)	Linear Feet of La	Year Start	Year End	Yearly Cost
Train Street Reconstruction (Eldredge Avenue to Ammons Lane)	$415,000	2917	2026	2026	$415,000.00
Skinner Way Reconstruction (Calistoga Street to Belfair Avenue)	$273,000	1,915	2027	2027	$273,000.00
Bowlin Avenue Reconstruction (Parker Lane to Leber Street)	$260,000	1,828	2028	2028	$260,000.00
Old Pioneer Way Reconstruction (North of Chief Emmons Lane)	$404,000	2,842	2029	2029	$404,000.00
Kansas Street Reconstruction (Budgeted Separately)					
Whitehawk Boulevard Extension (Budgeted Separately)					
Annual TBD Reconstruction After 2024 (TBD)	$900,000	NA	2024	2029	$150,000.00
OVERLAY PROJECT	Construction Cost (in 2023 dollars)	Linear Feet of La	Year Schedu	Year End	Yearly Cost
Corrin Avenue Overlay (Whitesell Street to Bridge Street)	$179,000	3,986	2024	2024	$179,000.00
Eldredge Avenue Overlay (Whitesell Street to Calistoga Street)	$90,000	1,990	2024	2024	$90,000.00
Anderson Street Overlay (Williams Street to Boatman Avenue)	$99,000	2,203	2024	2024	$99,000.00
Orting Avenue Overlay (Callendar Street to Whitehawk Boulevard)	$61,000	1,358	2024	2024	$61,000.00
Deeded Lane Overlay (Calistoga Street to Eldredge Avenue)	$145,000	3,216	2025	2025	$145,000.00
Ammons Lane Overlay (Leber Street to River Avenue)	$135,000	2,994	2025	2025	$135,000.00
Corrin Avenue Overlay (South of Harman Way)	$93,000	2,060	2026	2026	$93,000.00
Brown Street and Brown Way Overlay	$134,000	2,983	2027	2027	$134,000.00
Washington Avenue Overlay (South of Bridge Street)	$150,000	3,330	2028	2028	$150,000.00
Annual Overlay After 2026 (TBD)	$240,000	NA	2027	2029	$80,000.00
CHIP SEAL PROJECT	Construction Cost (in 2023 dollars)	Linear Feet of La	Year Schedu	Year End	Yearly Cost
Olive Street Chip Seal	$10,000	749	2025	2025	$10,000.00
Whitehawk Boulevard Chip Seal (Washington Avenue to Orting Avenue)	$69,000	5,617	2025	2025	$69,000.00
Calistoga Street Chip Seal (Kansas Street to Corrin Avenue)	$52,000	4,222	2025	2025	$52,000.00
Tacoma Avenue Chip Seal	$22,000	1,770	2025	2025	$22,000.00
Stone Street Chip Seal (Headley Avenue to Mellinger Avenue)	$12,000	982	2025	2025	$12,000.00
Eldredge Avenue Chip Seal (Calistoga Street to Kansas Street)	$41,000	3,313	2025	2025	$41,000.00
Annual Chip Seal After 2025 (TBD)	$120,000	NA	2026	2029	$30,000.00
CRACK SEAL PROJECT	Construction Cost (in 2023 dollars)	Linear Feet of La	Year Schedu	Year End	Yearly Cost
Boatman Avenue/Cloud Street/Nunnally Avenue Crack Seal (Lane Boulevard to Colorossi Circle)	$9,000	3,871	2024	2024	$9,000.00
Icey Street Crack Seal (East of Grinnell Avenue)	$4,000	1,729	2024	2024	$4,000.00
Grinnell Avenue Crack Seal (South of Balmer Street)	$4,000	1,642	2024	2024	$4,000.00
Williams Boulevard/Avenue/Court Crack Seal (West of Headley Avenue)	$8,000	3,356	2024	2024	$8,000.00
Williams Street Crack Seal (Ozzie Street to Williams Avenue)	$7,000	2,845	2024	2024	$7,000.00
Mellinger Avenue Crack Seal (Williams Street to Williams Boulevard)	$4,000	1,685	2024	2024	$4,000.00
Nunally Avenue Crack Seal (Cloud Street to Williams Boulevard)	$5,000	1,960	2024	2024	$5,000.00
Lane Boulevard Crack Seal (Nunnally Avenue to Washington Avenue)	$5,000	2,086	2024	2024	$5,000.00
Thompson Avenue Crack Seal (Callendar Street to Groff Avenue)	$4,000	1,688	2024	2024	$4,000.00
Calistoga Street Crack Seal (Ammons Lane to River Avenue)	$5,000	1,831	2024	2024	$5,000.00
Callendar Street Crack Seal (Thompson Avenue to Groff Avenue)	$4,000	1,676	2024	2024	$4,000.00
Train Street Reconstruction (Eldredge Avenue to Ammons Lane)*	$7,000	2917	2024	2024	$7,000.00
Skinner Way Reconstruction (Calistoga Street to Belfair Avenue)*	$5,000	1,915	2024	2024	$5,000.00
Bowlin Avenue Reconstruction (Parker Lane to Leber Street)*	$5,000	1,828	2024	2024	$5,000.00
Old Pioneer Way Reconstruction (North of Chief Emmons Lane)*	$7,000	2,842	2024	2024	$7,000.00
Corrin Avenue Overlay (South of Harman Way)**	$5,000	2,060	2024	2024	$5,000.00
Brown Street and Brown Way Overlay**	$7,000	2,983	2024	2024	$7,000.00

Washington Avenue Overlay (South of Bridge Street)**	$8,000	3,330	2024	2024	$8,000.00
Annual Crack Seal After 2024 (TBD)	$125,000	NA	2025	2029	$25,000.00
	$4,132,000.00				

** Crack Seal prior to scheduled reconstruction*

CITY OF ORTING

104 BRIDGE ST. S, PO BOX 489, ORTING WA 98360
Phone: (360) 893-2219 FAX: (360) 893-6809
www.cityoforting.org

June 28, 2023

Dear Council Representatives, Moore and Williams,

Subject: Scada

Our water and wastewater treatment facilities are controlled by SCADA that functions on the Wonderware (AVEVA) software, which operates on the Windows 7 platform. Both Microsoft and AVEVA have discontinued support for Windows 7 systems, so therefore, if our server or any computer experiences a failure, our capacity to monitor the system, and execute remote adjustments will be compromised. Moreover, alarms will not function exposing us to the risk of potential unauthorized access, allowing sabotage to our wells that could go unnoticed until irreversible harm is done.

Our team has evaluated various Scada platforms suitable for our water and wastewater facilities. As part of this, we have received PowerPoint presentation from Parametrix and a technical memo from Technical Systems Inc. (refer to Appendices A & B). Both organizations opine that maintaining our current system would be most beneficial for the City of Orting, and their reasoning includes:

1. We hold an existing license for Wonderware (AVEVA), and our paid annual maintenance fee of $6,000 entitles us to complimentary software updates.
2. AVEVA's influence in Washington is broad. Every integrator in the region employs programmers skilled in this software system's programming and support. Our team knows of only one agency (Port Angeles) in Western Washington utilizing Siemens software. Agencies utilizing AVEVA in Washington are listed in the PMX PowerPoint presentation. The availability of skilled programmers is crucial for addressing issues any time of the day or night.
3. Both PMX and TSI have indicated that finding Siemens programmers for water/wastewater plants is challenging. Of TSI's 16 programmers, only one has Siemens programming expertise, while the rest have experience with AVEVA.
4. As per PMX, a transition from AVEVA to Siemens could cost over $1 million (see PMX PowerPoint presentation, page 7) and potentially take more than a year to complete, leaving the city vulnerable until the system update is accomplished.
5. The AVEVA software is compatible with the upcoming biosolids upgrade.

Proposed Solution: We have received two proposals for updating our Windows 7 platform to Windows 10/11, one from Parametrix and the other from Technical Systems Inc.

The cost estimates for the Scada transition from Windows 7 to Windows 10/11 are as follows:

- Parametrix: $43,388 (exclusive of computers/server) – Appendix C
- Technical System: $24,000 (exclusive of computers/server) – Appendix D

Moving to a different system would necessitate an extensive software rewrite, potentially costing over $1 million if we switch from AVEVA to Siemens. Such a significant expense warrants thorough research on our part, which could take several months.

Given the potential cost and time required for the changeover, our team suggests that we proceed with the AVEVA upgrade at a cost of $24,000 (plus hardware), as this will help ensure the stability of the City's water/wastewater system.

Should the public works committee desire, our team is open to continue exploring other options in more depth at a future date. We look forward to receiving your input.

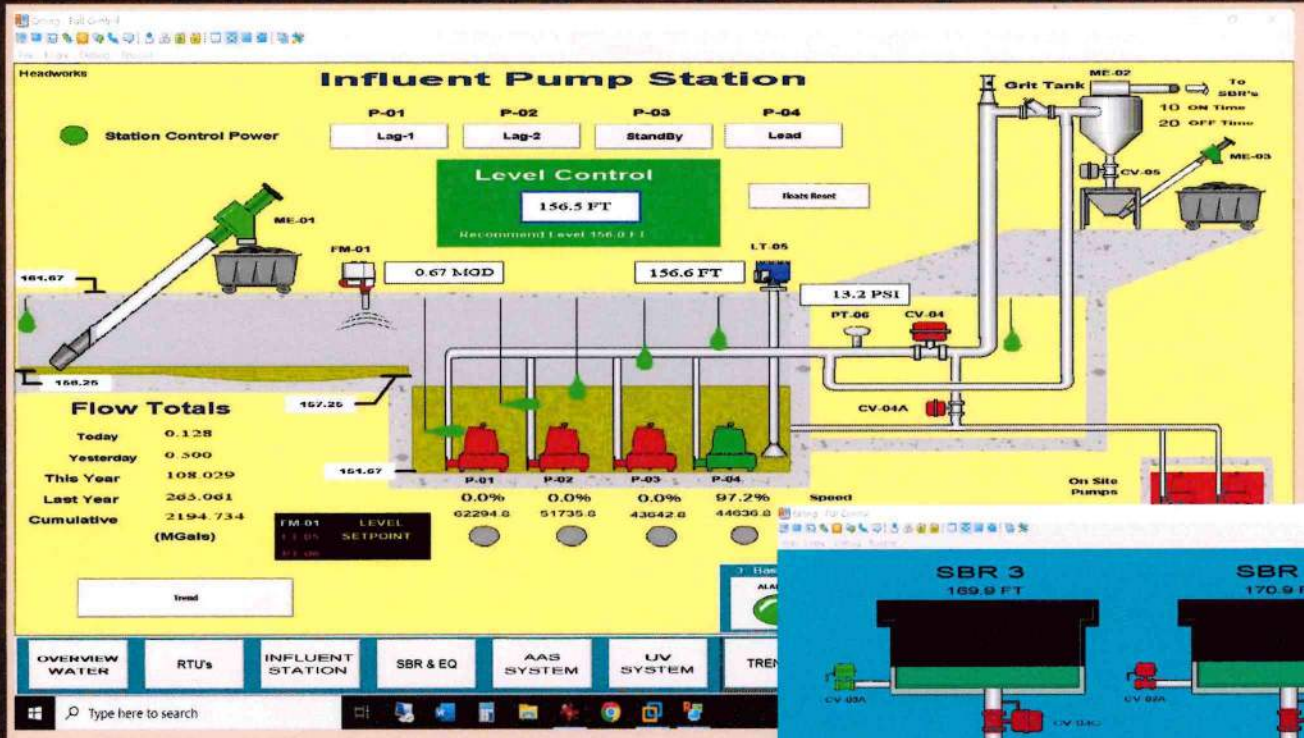
John

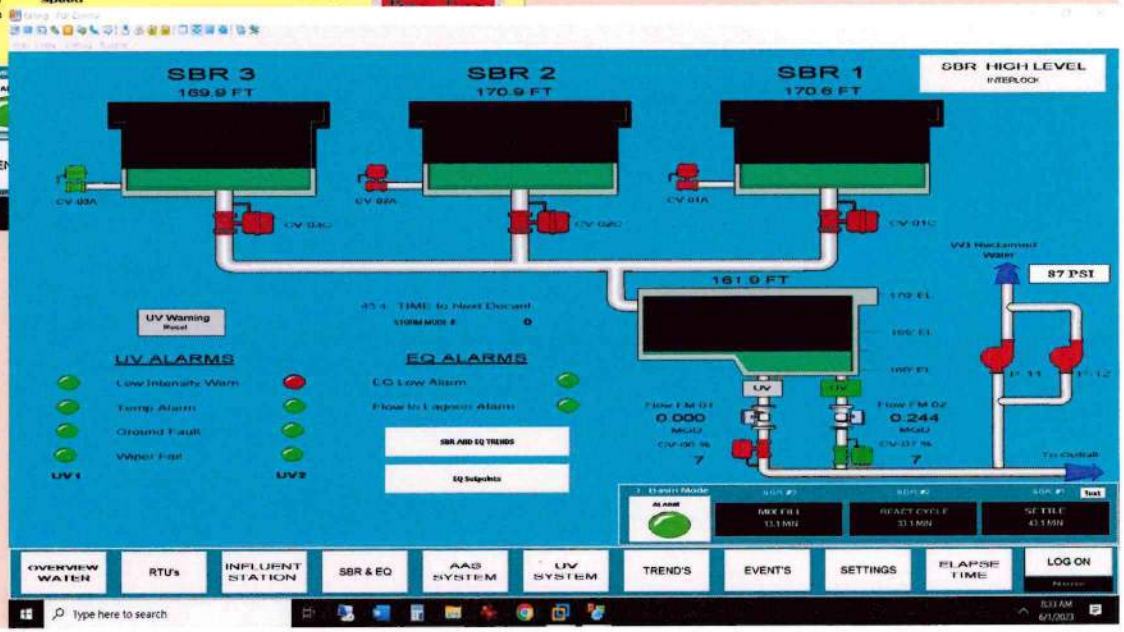
John Bielka
Acting Public Works Director
City of Orting

CC Scott Larson , City Administrator

Appendix A: Parametrix Power Point

Orting Utility SCADA





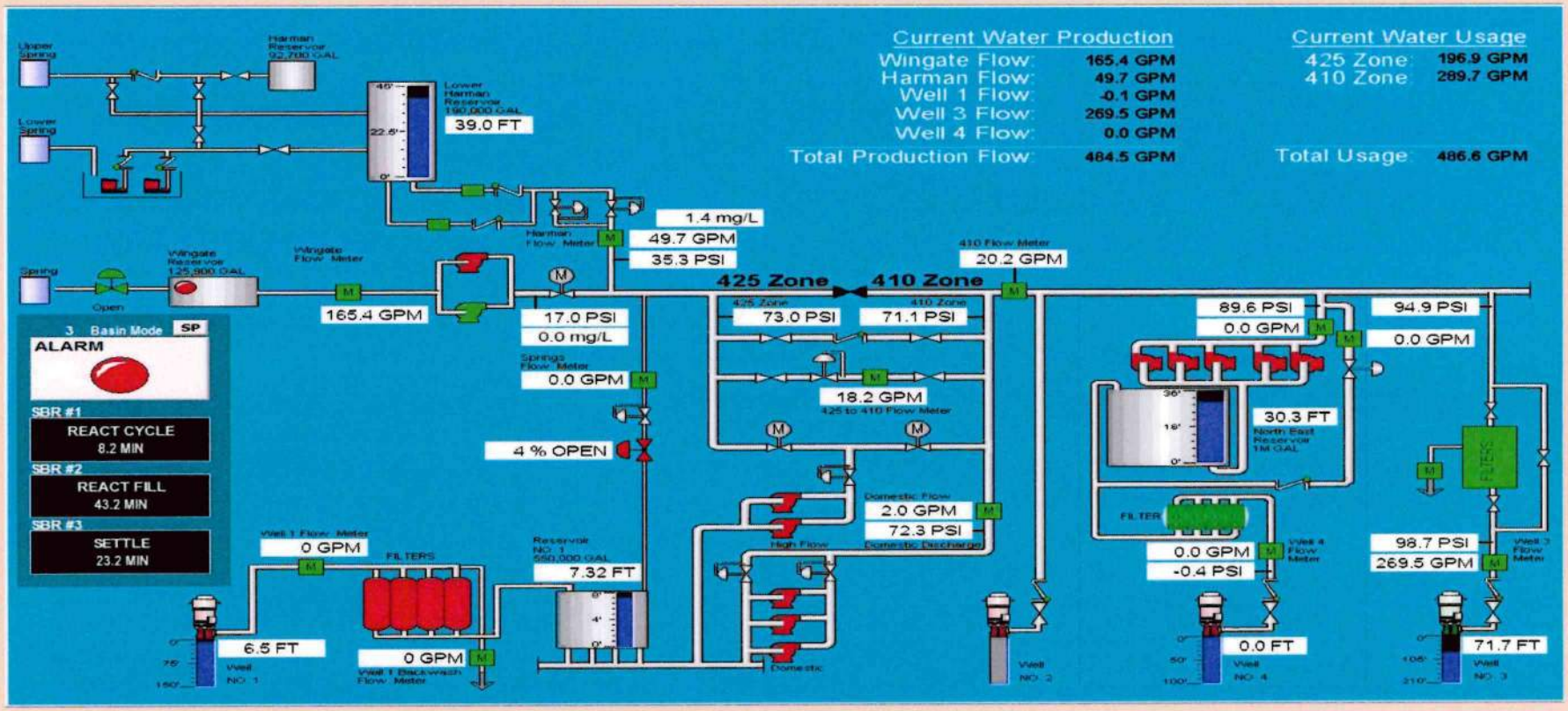
Public Works Committee

7/5/23

Current System - Overview

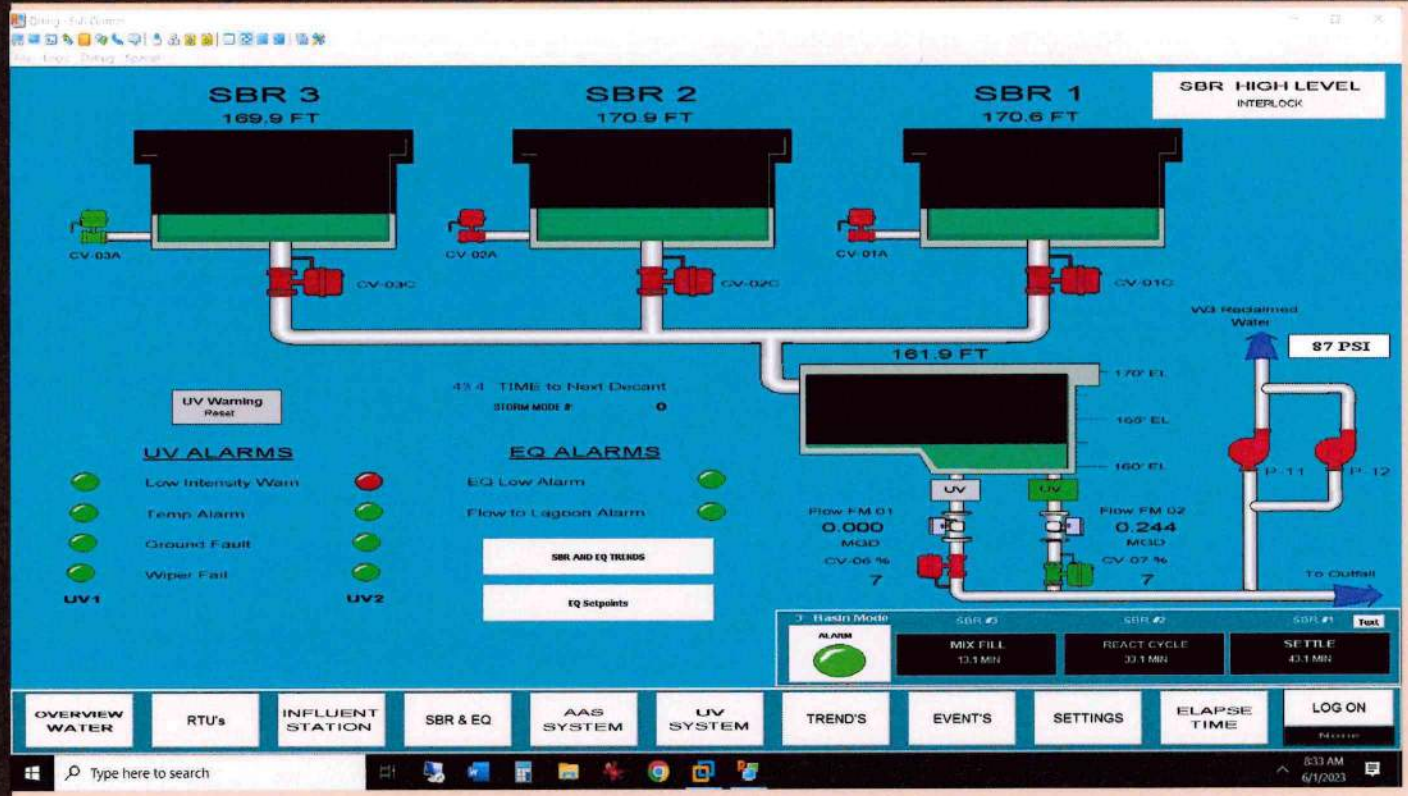
- AVEVA (Wonderware)
- Windows 7 PCs no longer supported by Microsoft and AVEVA due to age
- If it fails:
  - Lose ability to see and make changes to system
    - Lose remote viewing
  - System will continue to function as programmed
  - Changes would need to be made by a system integrator / programmer locally with the appropriate PLC software.
  - Lose alarm callout
  - Need to physically be at each site to observe operations
  - Limited localized HMI viewing
    - Well 1
    - Well 3
    - Well 4
    - WRRF

Current System - Water



- AVEVA (Wonderware)
- 671 IO Points
  - 388 DI
  - 195 DO
  - 55 AI
  - 33 AO
- 10 PLCs (Allen Bradley)
- 64 Motors & Valves
- 8 Control Loops
- 190 Alarms

Current System - Wastewater



- AVEVA (Wonderware)
- 531 IO Points
  - 356 DI
  - 125 DO
  - 37 AI
  - 13 AO
- 10 PLCs (Allen Bradley and 1 Automation Direct)
- 42 Motors & Valves
- 4 Control Loops
- 227 Alarms

Other Systems

Utility	PLC	SCADA	Notes:
City of Bellevue	Siemens	Aveva	
City of Port Orchard	Allen Bradley	Aveva	
City of Duval	Allen Bradley	Aveva	
Marysville	Allen Bradley	Avea	
Bellingham	Allen Bradley	Aveva	
King County	Allen Bradley	Ovation	
SPU	Allen Bradley	Aveva	
Edmonds	Allen Bradley (previous Siemens)	Aveva	
Sumner	Allen Bradley (previous Moscad)	Aveva	
City of Kent	Allen Bradley	Aveva	
City of Puyallup	Rugid	Aveva	
City of Olympia	Rugid	Aveva	Moving to Aveva from Citect
Tulalip Tribe	Allen Bradley	Ignition	
Muckleshoot Tribe	Allen Bradley	Factory Talk	
Nisqually Tribe	Allen Bradley	Aveva	
Cowlitz Tribe	Allen Bradley	Aveva	
Potlatch	Allen Bradley	Aveva	

Other Systems

Utility	PLC	SCADA	Notes:
City of Shelton Wastewater	Allen Bradley	Aveva	
City of Shelton Water	Automation Direct	Aveva	
WA State Parks	Allen Bradley	Aveva	
Fruitland Water	Automation Direct	Aveva	
City of Pacific	Allen Bradley	Aveva	
Snohomish Solidwaste	Allen Bradley	Factory Talk	
Valley Water	Allen Bradley	Factory Talk	
Port of Sunny Side	Allen Bradley	Factory Talk	
City of Auburn	Allen Bradley	Aveva	
City of Yelm	Allen Bradley	Aveva	
City Chehalis	Siemens	Aveva	
City of Central	Allen Bradley	Aveva	
Spanaway Water	Allen Bradley	Aveva	
Snohomish Wastewater	Allen Bradley	Factory Talk	
City of Eatonville	Automation Direct	Aveva	Considering Moving to Allen Bradley PLC's
Lott	MAX DCX		
BES		iFix	Considering Moving to Aveva
Clackamas WES	Allen Bradley	Aveva	

Upgrade Costs/Options

- Upgrade AVEVA
  - $43,388 programming cost
  - Approximately $12,000 in hardware cost
  - Total cost $55,388
- Other systems
  - SCADA re-write is approximately $525,000 based on number of points
    - Approximate software cost is $30,000
  - PLC re-programming is approximately $310,00
  - hardware approx. $200,000

Total Change over cost = $1,065,000

Appendix B: Technical System Memo

TSI Technical Systems Inc.

Corporate Office
2303 196th Street SW
Lynnwood, WA 98036
Tel 425.775.5696
TSIcontrols.com

June 27, 2023

John Bielka
Orting Wastewater Treatment Plant
902 Rocky Road Northeast
Orting, WA

Orting Wastewater Treatment Plant SCADA Upgrade
RE: Request for information on the impact of changing SCADA platforms

John,

Thank you for taking the time to view and discuss your system on June 14th. Based on our conversation, it is my understanding that the WWTP needs to upgrade their SCADA system hardware to migrate the existing computers from Windows 7. Since this version of Windows is no longer supported, upgrading the system to a newer version should be a priority. Cybersecurity threats have become a large issue for Municipalities. Based on my site visit, a review of your system and my recommendations are below.

Site Conditions and Equipment

You are currently running Wonderware InTouch 2014 R2 SP1 for your SCADA system. You are currently paying for annual support with AVEVA (Previously known as Wonderware). This annual support agreement allows for free upgrades to the newest version of the software.
The site hardware includes:

- 2 Thick clients at the WWTP.
- 1 Thick client at Well 4.
- 1 Thick client at the Public Works building.
- 1 Historian server at the Public Works Building.

Upgrade Options

There are numerous systems that can be used for SCADA systems. Below is a list of some of the major SCADA software systems currently used in the Water/Wastewater industry.

Schneider Electric - AVEVA InTouch: This is the current system you are using. Their presence in Washington is very extensive in the Water/Wastewater market. Every Integrator/Engineer in the area has programmers with knowledge of how to program and support this software system. This system allows you to connect to any PLC manufacturer. The major downside to this system is the initial software purchase cost which tends to be the highest for SCADA software systems. For your system, you have already absorbed this initial cost and you pay for the annual support contract. With this annual support, you can upgrade the system with the most up to date software version for free. The only cost is the labor to install the software and convert the 2014 version to the latest version and make the necessary updates.

Rockwell Automation - FactoryTalk View SE: This is a Rockwell system that is designed to work with Rockwell PLCs. Like Wonderware, they have a large presence in Washington's Water/Wastewater market. Every Integrator/Engineer in the area has programmers with knowledge of how to use it. This system will only connect to Rockwell PLCs natively. To communicate with other brands of PLCs, you must convert the data and move it into one of your existing Rockwell PLCs to be displayed on the screens. The software cost can be extensive based on the number of screens and the type of system. The major downside to

going with this software is the labor cost to convert your system. Every screen will need to be re-created and each point will need to be re-tested.

Inductive Automation – Ignition: This is a software system that was initially launched in 2010. They have a large presence in California and are quickly gaining market share in the Water/Wastewater industry. Currently the City of Portland, OR is converting over to this system. TSI has several employees that are certified and knowledgeable with this software. This system allows you to connect to any PLC manufacturer. The upside to this vs AVEVA or FactoryTalk is the software cost. It is considerably less than the others while still having the same level of functionality. The major downside to going with this software is the labor cost to convert your system. Every screen will need to be re-created and each point will need to be re-tested.

Siemens – Simatic WinCC: This SCADA system is used predominantly in the manufacturing industry and is very popular in Europe. The software is designed to work with Siemens PLCs. They have a very low market share in the Water/Wastewater industry, which makes it difficult to find qualified programmers to support a Water/Wastewater system. We are only aware of one municipality that uses Siemens PLC's and Simatic WinCC. The software cost is roughly the same as the initial cost of AVEVA Intouch. The major downside to going with this software is the labor cost to convert your system. Every screen will need to be re-created and each point will need to be re-tested.

Conclusion

From reviewing your system and comparison with other standard industry options, I would recommend that you continue using AVEVA InTouch. Since you are currently up to date with annual support with AVEVA, the upgrade cost would only be the labor to install the new software and convert this software from the 2014 version to the latest version. Changing to a new SCADA system would require a major investment in re-programming and re-testing of your system requiring roughly $250K in costs for software and labor.

If you have any questions, please feel free to reach out to me.

Best Regards,

Lucas Koelle
Chief Operations Officer
Technical Systems Inc
Office : 425.678.4178
Mobile: 206.819.1358
Email: lucask@tsicontrols.com

Appendix C: Parametrix Proposal

SCOPE OF WORK

City of Orting
SCADA System Upgrade 2023 (Water and Wastewater)

PROJECT OVERVIEW

At the request of the City of Orting (City), the following scope of work (SOW) has been prepared detailing the effort required to complete the City's supervisory control and data acquisition (SCADA) upgrade for the Water and Wastewater departments.

Parametrix will provide services on a time-and-materials basis. The approved budget will not be exceeded without specific written authorization from the City.

Project Assumptions

- This SOW covers SCADA upgrade services for both the Water and Wastewater departments' assets, limited to four physical computers.
- The City will provide maintenance and operations (M&O) staff as needed.
- The City will provide all hardware, software, and software licensing required for implementation of this project.
- The version of AVEVA System Platform (formerly known as Wonderware System Platform) to be installed will be the latest release of version 2023 at the time notice to proceed is given.
- The type of Microsoft operating system used will be Long-Term Servicing Channel (LTSC).
- The workstation PCs will be provided by the City and will operate on Windows 11. The SCADA server will be provided by the City and will operate on Windows Server 2022. Local administrator privileges will be available on every PC being upgraded on the SCADA system.
- The City is currently under a support contract with AVEVA and WIN-911.
- This SOW excludes the upgrading or installation of programmable logic controller (PLC) or radio hardware or instrumentation.

TASK 01 – PROJECT MANAGEMENT

Goal

Provide project team coordination to ensure the project is completed within scope, schedule, and budget.

Approach

The specific activities included under this task shall include the following:

- Project administration, including project accounting, contract progress reports, and generation of invoices.

- Project coordination, including correspondence and project task coordination.

Deliverables

Deliverables shall consist of the following:

- Project progress reports and invoices.

Assumptions

- It is assumed that the duration of this project is 6 months, with a majority of the work occurring around late September to early October of 2023.

TASK 02 – SCADA UPGRADE SERVICES

Subtask 02.01 – Software Installation & Licensing

Goal

Install and configure updated SCADA software and associated licensing for the project.

Approach

Activities under this subtask include the following elements:

- On the main SCADA server provided by the City, install and configure the following software:
  - AVEVA System Platform
  - AVEVA Historian
  - AVEVA Historian Client
  - Radmin
  - OI CIP Server
  - TOP Server

  The main SCADA server will be located in the Lab where the existing SCADA server resides.
- On updated workstation PCs provided by the City, install and configure the following software:
  - AVEVA WindowViewer
  - AVEVA Application Manager
  - Operations Integration (OI) Common Industrial Protocol (CIP) Server (if applicable)
  - WIN-911 (on the Lab workstation only)
- The workstation PCs mentioned above will be located in the following areas:
  - The Water Resource Recovery Facility (WRRF) Laboratory Building
  - The WRRF Electrical Room
  - The City's Well No. 4 Facility

- If it is determined that the hardware is not performing as required for the AVEVA and/or WIN-911 software, or if the reporting tools fail to function as required, the City will be notified and Parametrix will delay further work until the City has corrected the issues. Work will resume no later than 3 working days after the City has notified Parametrix of the issues being corrected.
- Correspond weekly via email with City representative as to status of programming efforts.
- Correspond via email as needed for any information needed from the City to facilitate the conversion.
- Coordinate information between Parametrix staff and the City.
- Upgraded system will be operated in parallel with existing system during the verification period.
- The new server and workstations will operate under an IP scheme that is different from the existing SCADA server and workstation computers and will use different computer names to minimize the risk of communication issues while the old and new systems are running in parallel.
- WIN-911 version 2021 will be used for this project.

Deliverables

Deliverables are as follows:

- On- and off-site services to configure and install SCADA software for the project.
- SCADA software installation files stored on the City's SCADA server.
- Up to two on-site meetings with City staff during this subtask.

Assumptions

- New City-procured SCADA PC hardware will be prepared by the City for installation of the SCADA system software by Parametrix with administrator privileges.
- Accounts with names, passwords, and appropriate user rights will be set up by the City.
- Parametrix will assign dedicated SCADA network internet protocol (IP) addresses for the new SCADA PCs being added to the SCADA system as part of the upgrade.
- This subtask is limited to the SCADA and alarm notification system upgrades only.
- The existing SCADA system software by AVEVA will be upgraded to version 2023 based on existing City licensing information available at the time of this SOW.
- The City will fulfill the system requirements for the SCADA workstations and server per the AVEVA technical document "AVEVA System Platform 2023 readme." Parametrix will assist the City with purchasing hardware by providing recommended hardware specifications.
- The City will provide Parametrix with remote access to the SCADA network during the project.

Subtask 02.02 – Operator Graphics Conversion

Goal

Convert the existing AVEVA human-machine interface (HMI) application to the latest version licensed by the City. Additionally, provide oversight and coordination during the conversion process.

Approach

Activities under this subtask include the following:

- Conversion of current AVEVA application to latest version.
- Adjustment and configuration of the OI CIP Server.

Deliverables

Deliverables are as follows:

- Backup copy of the converted AVEVA application files on the City's SCADA server.

Assumptions

- Provide on-site services to convert the existing AVEVA application to the highest version currently licensed by the City.
- Subtask is limited to graphic conversion to the latest version only.

Subtask 02.03 – Screen Verification & Testing

Goal

Provide review and operational testing of SCADA screens once the conversion has been complete under Subtask 02.02.

Approach

Activities under this subtask include the following elements:

- Screens verification. Review main overview screens and faceplates to verify functionality was preserved during the conversion.
- The remainder of the SCADA HMI screens will be corrected based on a City staff-generated list of issues.

Deliverables

Deliverables are as follows:

- A project checklist document identifying the changes made based on the list provided by the City.
- On-site workshops with City staff to review the converted SCADA screens and exchange feedback.

Assumptions

- City staff will review the SCADA screens and develop a list of issues for correction by Parametrix.

Subtask 02.04 – Alarm Notification System Upgrade

Goal

Upgrade WIN-911 software to current version while minimizing downtime of the alarm notification system.

Approach

The specific activity included under this subtask is as follows:

- Provide services to upgrade WIN-911.
- Provide training to staff on operation and maintenance of the upgraded WIN-911 software.

Deliverables

Deliverables are as follows:

- Backup copy of converted WIN-911 application files on the City's SCADA server.

Assumptions

- The City will provide Parametrix with staff to support testing of the WIN-911 alarm notification system.

Subtask 02.05 – Post-Upgrade Support

Goal

Provide support to City during the verification period.

Approach

Activities under this subtask include the following elements:

- The period will be 60 days (2 months) after completion of the upgrade process.
- Provide support via remote access to adjust anomalies found in the SCADA system resulting from the upgrade. Anomalies will be identified by the City and communicated to Parametrix in email form.
- Decommissioning of the old system at the end of the 2-month verification period.

Deliverables

Deliverables are as follows:

- Provide on-site services for post-upgrade support.
- A project checklist document identifying the changes made based on issues identified by the City.

Assumptions

Continued validation and documentation of any issues found shall be performed by City personnel over a 2-month period after Parametrix reaches substantial completion. During the 2-month period, the old system will be kept operational and Parametrix will be provided the opportunity to correct deficiencies resulting from the SCADA upgrade.

Deficiencies arising from technical issues due to manufacturer's defects and quality control (beyond Parametrix control) shall be noted and patches (when available) applied by Parametrix either at the City's expense (outside the SOW) or under this SOW, provided funds have not been depleted.

CYBERSECURITY DISCLAIMER

Parametrix has provided SCADA and PLC programming services consistent with this scope of work. Parametrix has not and will not provide information technology security services to protect the City's networks and equipment from breaches or hacks from outside sources. As such, the City should consider the following:

- The City is encouraged to proactively monitor their environment for security threats. Parametrix does not provide this service.
- The City is encouraged to engage a qualified, independent third party to perform an operational security assessment of the industrial control system environment.
- Where a firewall or other perimeter security device is provided in conjunction with the scope of work, we recommend that:
  - The configuration of these devices be evaluated by qualified personnel.
  - The devices be properly maintained with available threat and anti-virus subscription services.
  - The firmware on the devices be kept reasonably up to date per manufacturer's recommendations.
- Parametrix is not responsible for Windows or other operating system maintenance (patching, anti-virus, etc.) associated with the implementation/design of the system.
- Parametrix is not responsible for the maintenance/configuration of any remote access (i.e., virtual private network) capabilities. These should be configured in accordance with the City's organization practices.
- Parametrix encourages the use of multifactor authentication for any and all remote access to the control environment.

Client: City of Orting
Project: SCADA System Upgrade 2023 (Water and Wastewater)
Project No: 999-1711-999

					Marvin C. Casanova	Glen E. Barcus	April D. Whittaker	Kyle E. Hale
					Sr Electrical Engineer	Sr Electrical Designer	Sr Project Control Specialist	Project Accountant
				Rates:	$215.00	$205.00	$150.00	$120.00
Task	**SubTask**	**Description**	**Labor Dollars**	**Labor Hours**				
01		**Project Management**	**$3,840.00**	**22**		**12**	**6**	**4**
	01	Project Management	$3,840.00	22		12	6	4
02		**SCADA Upgrade Services**	**$36,880.00**	**176**	**80**	**96**		
	01	Software Installation & Licensing	$8,440.00	40	24	16		
	02	Operator Graphics Conversion	$3,280.00	16		16		
	03	Screen Verification & Testing	$10,000.00	48	16	32		
	04	Alarm Notification System Upgrade	$6,880.00	32	32			
	05	Post-Upgrade Support	$8,280.00	40	8	32		
		Labor Totals:	$40,720.00	198	80	108	6	4
		Totals:	**$40,720.00**		**$17,200.00**	**$22,140.00**	**$900.00**	**$480.00**

Other Direct Expenses	
Mileage	$92.00
Automation Direct - IO Server & Modem	$2,576.09
Other Direct Expenses Total:	**$2,668.09**

Project Total **$43,388.09**

Appendix D: Technical System Proposal

Technical Systems Inc.
Corporate Office
2303 196th Street SW
Lynnwood, WA 98036
Tel 425.775.5696
TSIcontrols.com

Scope Letter: 2 Pages **Quote Number: 8641**

June 27, 2023

To: **City of Orting WWTP**

Attn: **John Bielka**

Project: **SCADA System Upgrade**

Technical Systems, Inc. (TSI) is pleased to provide a quote for the above-referenced project. TSI's price does not include sales tax.

Bid Items

Bid Item #	Bid Item Description	Price
1	SCADA System Upgrade	$24,400.00
	Total Bid*	**$24,400.00**

***For supply of items and services as listed under scope of supply only.**

Scope of Supply:

Control Panels

Bid Item #	Description	DWG / Spec Reference
1	Conversion of the existing Wonderware InTouch Version 2014 R2 to the most up to date version of Aveva Intouch. - Computer hardware will be provided by the city. - TSI will install and convert the existing system to the new version of Aveva Intouch at our office. - TSI will come to the site and install the computers. - One of the original computers will be left running as a temporary backup during installation and verification. - SCADA screens will be spot checked to verify operation.	N/A

TSI Submittals

Submittals are not included in this price.

Programming

Conversion of the existing system over to the updated version.

Software

No software is included in this price. This quote is completed with the understanding that the city has an up to date and active support contract with Aveva. If any additional licensing is required, this will be brought to the attention of the city to be purchased by them or through TSI.

Hardware

No computer hardware is included in this price. The city will purchase any computers and servers required. These will then be given to TSI for software configuration.

Training

Training is not included in this price as the system will work the same.

Testing

Spot checking of the system will be completed at the time of installation.

Clarifications

- Pricing is for conversion only. Any changes from the original layout and operation may come at an additional cost.

Exclusions

- Supply, installation of equipment, termination of wire, cable, conduit, supports, mounting brackets, disconnects, mounting stands, rain / sun hoods and any materials that are not specifically itemized above.
- All equipment, Instrument, and panel field installations.
- All field wiring, wire/cable terminations, and associated testing.
- All testing other than stated under scope of supply.
- All hardware, software and components not listed under scope of supply.
- All SCADA, PLC, OIT software licenses and support services.
- All computer hardware.

Please feel free to contact me to discuss any questions or comments you may have regarding this quotation.

Best Regards,

Lucas Koelle
Chief Operations Officer
Technical Systems Inc
Office : 425.678.4178
Mobile: 206.819.1358
Email: lucask@tsicontrols.com

TSI

Leaders in Integrated Water Solutions Since 1970

WILSON
ENGINEERING

CITY OF ORTING

STATEMENT OF QUALIFICATIONS

WATER RESOURCE RECOVERY FACILITY IMPROVEMENTS

June 27, 2023

WILSON ENGINEERING

John Bielka
Acting Public Works Director
Public Works Department
900 Rocky Road P.O. Box 489
Orting, WA 98360

RE: Statement of Qualifications - WRRF Improvements

Dear John,

I am pleased to present our proposal for the City of Orting Water Resource Recovery Facility Improvements. I have enjoyed getting to know you over the last few months and appreciate the opportunity to provide our engineering services and look forward to building a long-term relationship with you and the City of Orting.

Who we are: We are a civil engineering firm with more than 56 years of operations in Washington State. Our specialty lies in assisting small to medium-sized cities and towns in creating and restoring vital public infrastructure. We have extensive experience with planning, permitting, funding, design, operations, and construction management for wastewater treatment facilities, all of which will be directly applicable to your project. We can provide assistance throughout all project phases, from funding applications and design to construction management and operations manuals.

Experience: Our experience and expertise in designing wastewater treatment plant designs for small towns in Washington will prove invaluable for the improvements Orting is planning. We understand the need for cost-effective infrastructure that is simple to operate and maintain. We work closely with staff and operators, who have the experience and institutional knowledge, to collaboratively design the best solutions.

Project Team: We have a very experienced group of wastewater engineers ready to support the City with your treatment plant improvements. I will serve as the Senior Project Manager. I have over 15 years of experience in exactly this type of work and understand the key pieces of a successful project. Jeff Christner, will act as Principal Engineer for your project. He is knowledgeable and experienced in wastewater treatment design, specifically biosolids improvements. Together, Jeff and I have designed upgrades for over twenty wastewater treatment plants in Washington. The timing for this project fits perfectly with our schedule as we just finished design and construction management of the Ferndale WWTP and design of the Friday Harbor and Eastsound WWTP upgrades. We are committed to meeting the City of Orting's quality and schedule expectations.

Thank you again for the opportunity to submit our proposal for consideration. We look forward to the exciting prospect of working with you on this project and many more in the future.

Very truly yours,

Scott Wilson, PE
Senior Project Manager, Partner
C. 360.303.1759
swilson@wilsonengineering.com

AREAS OF EXPERTISE

- Wastewater
- Water
- Stormwater
- Facility Planning
- Operations Support
- Sewer & Water System Plans
- Hydraulic Modeling
- GIS & Utility Mapping
- Construction Management
- Construction Inspection
- Funding Assistance & Admin
- Permitting
- Site Development
- Land & Hydrographic Surveying
- 3D Scanning
- UAV /Drone Surveys

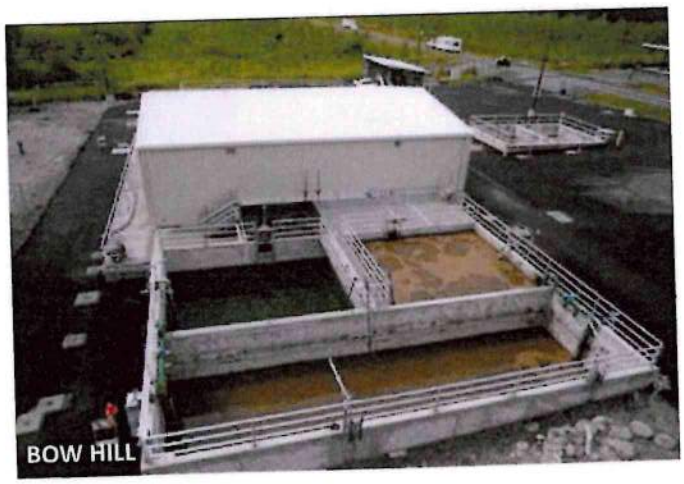
ABOUT WILSON ENGINEERING

Wilson Engineering is a medium-sized firm with 33 professionals, including 18 engineers and 6 surveyors. Our company has long provided wastewater engineering services to numerous cities, towns, and water and sewer districts. Through our long service to these communities, we have accumulated the expertise the City of Orting will need through all phases of a project, including: permitting, funding assistance, sewer and facility planning, evaluation of alternatives, wastewater treatment plant design, biosolids handling solutions, wastewater operation support, and construction management. A few longstanding clients with wastewater engineering needs similar to yours include:

- Eastsound Sewer District (0.2 MGD) - 37 years
- City of Everson (1 MGD) - 34 years
- Lake Whatcom Water and Sewer District - 29 years
- Samish Sewer District - 22 years
- City of Moses Lake (0.75 and 4.0 MGD) - 20 years
- City of Ferndale (4.1 MGD) - 18 years
- Upper Skagit Indian Tribe (0.2 MGD) - 12 years
- Town of Wilbur (0.2 MGD) - 10 years
- Town of Friday Harbor (0.4 MGD) - 6 years
- Town of Port Gamble (0.1 MGD) - 5 years

Our experience with these clients and many others is very similar to the specific needs the City of Orting will face when evaluating and designing solutions for your biosolids and headworks improvements project. This support includes advising our clients on layout and configuration options, evaluating alternatives, finding cost-effective solutions, managing the construction process, and assisting with operational support. For all of our wastewater projects, writing or updating sewer plans, facilities plans, or engineering reports has been required. We write detailed reports quickly and effectively to ensure a quick turnaround from Ecology and a report that is useful to the City. The vast majority of our wastewater projects were completed locally in Washington State where we are knowledgable about regulations, effluent requirements, future proposed regulations, permit requirements, and funding options. We have an excellent relationship with the Department of Ecology and many of their engineers, as well as funding experts and biosolids coordinators.


MOSES LAKE


BOW HILL

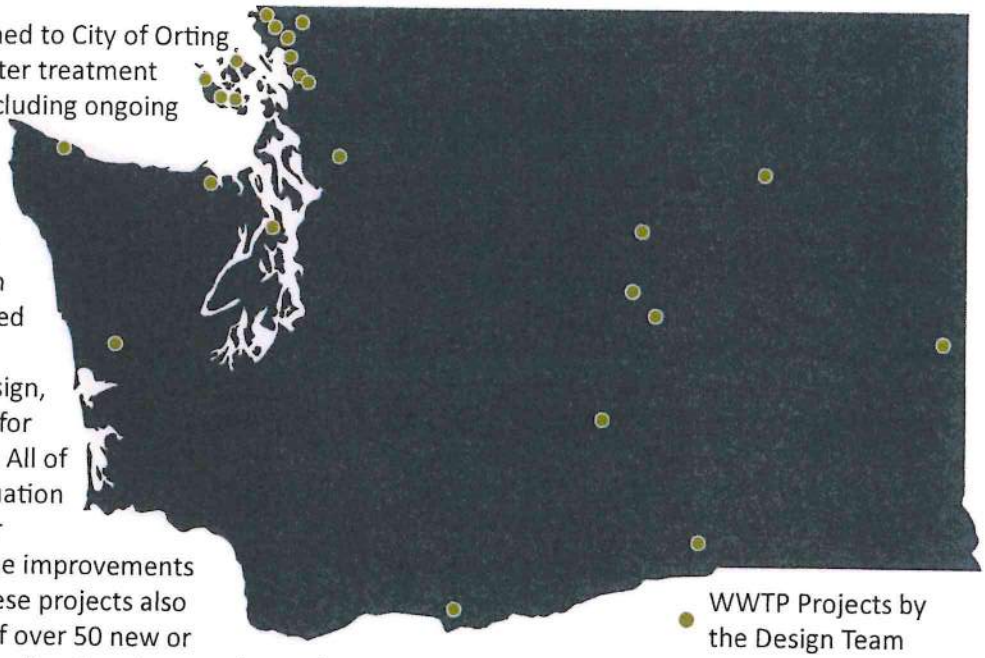
FUNDING AND PERMITTING EXPERTISE

We routinely assist our clients with procuring permits and funding through the Department of Ecology, CDBG, US Department of Housing and Urban Development, USDA-Rural Development, EPA, Recreation Conservation Office funding, Department of Health, and Public Works Trust funding.

In the last 5 years, we have procured over $59 million dollars in grants and loans for our clients.

WASTEWATER EXPERIENCE

The project team we have assigned to City of Orting has completed over 25 wastewater treatment plant projects in Washington, including ongoing WWTP upgrades at Friday Harbor, Roche Harbor, and Eastsound Water and Sewer District. These projects were for communities ranging in size from 250 to 23,000 people and included the completion of engineering reports, general sewer plans, design, and construction administration for wastewater treatment upgrades. All of these projects included the evaluation or design of biosolids handling or treatment processes similar to the improvements the City of Orting is planning. These projects also included evaluation and design of over 50 new or rehabilitated sewer pump stations, headworks screening and grit removal, flow equalization basins, aeration basins, digestors, SBRs, MBRs, secondary clarifiers, RAS/WAS systems, and UV disinfection.



WWTP Projects by the Design Team

BIOSOLIDS HANDLING EXPERIENCE

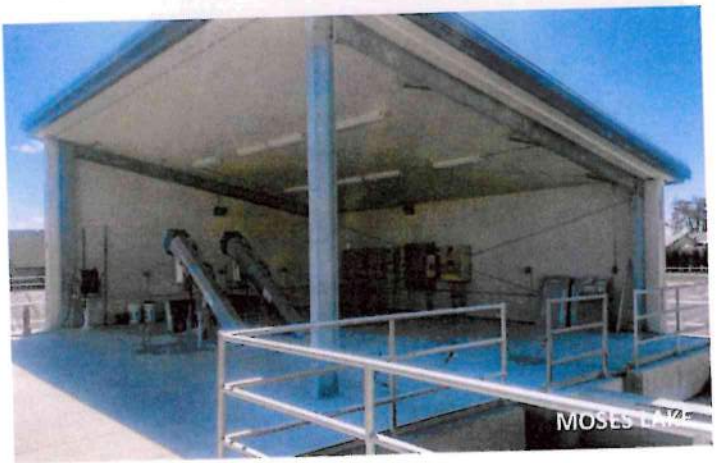
Biosolids handling is a significant part of all wastewater treatment plants and our project team has considerable experience in evaluating options, making recommendations, and designing solutions for processes and equipment appropriate for the client and conditions. The team has evaluated, planned, and designed biosolids handling systems for treatment plants similar to Orting and can apply that experience to the City's potential upgrades. Just recently, as part of our facility planning and design for the Town of Friday Harbor wastewater treatment plant, we wrote a comprehensive report evaluating the City's biosolids system. This report, completed in 2019, included evaluation of their existing digestor, solids pumping system, dewatering press, drum dryer, and conveyance system. We evaluated the latest technologies for dewatering and ultimately settled on a new centrifuge system to replace their existing filter press and drum dryer along with upgrades to their digestor, pump system, and new conveyance system. The research and design information we just completed on this project will give us a useful head start when evaluating solutions for your facility.

The project team has also designed and evaluated biosolids handling systems for Stanwood, Eastsound, Ferndale, Bow Hill, Port Gamble, and Moses Lake in recent years, including systems to generate Class A biosolids. All of these projects were slightly different, utilizing different technologies and methods we can potentially apply to Orting. The designs for both the Eastsound WWTP and Stanwood Biosolids Facility included FKC screw presses as part of their dewatering system.

HEADWORKS DESIGN EXPERIENCE

Our team has designed many mechanical screening and grit removal headworks facilities. We are knowledgeable with various screening types, manufacturers, grit removal systems, and layouts and configurations. The images to the right show various designs our project team has completed which may be appropriate configurations for Orting to consider. The top image is the fine-screen headworks at the Port Gamble MBR WWTP. This headworks is completely outdoors with an aerated grit basin upstream of two mechanical fine screens (2mm opening size). The screens are insulated and heat traced to handle freezing temperatures.

The second image is the Friday Harbor WWTP headworks. Unlike Port Gamble, the 3-mm mechanical screens are located within an enclosed building protecting them from the elements. The channels are completely covered and foul air is removed and treated with a biofilter odor control system. This configuration is very nice, but it is considerably more expensive to have an enclosed building, covered channels, and odor control system. Another nice feature of the Friday Harbor headworks is the grit removal system. The grit removal system consists of two aerated grit removal basins. Aeration is achieved via course bubble diffusers which create a spiral flow pattern settling grit on the bottom. These basins have proven highly successful, achieving as much grit removal as the Town's previous vortex grit removal system. Grit is removed from the basins with grit pumps to a dewatering classifier.



The third image is one of three headworks designs we completed for the City of Moses Lake. This picture is the headworks at the central operations facility, which has two aerated grit removal basins followed by redundant 3/8-inch opening size mechanical screens. This shelter configuration would most likely be the configuration we would recommend for the City of Orting. It consists of a two-walled shelter to protect equipment, but does not require the high costs of a completely enclosed structure. We would position the walls appropriately to block winds, and heat trace and insulate equipment to prevent freezing. Instead of pumping grit to a classifier, grit is removed from the basins every six months with a vactor truck.

All our headworks designs are sized so that each screen is capable of handling peak flows. We also always include a manual bypass channel with a 3/8-inch bar screen for emergency situations or bypass needs.

ORGANIZATIONAL CHART

The key personnel assigned to this project team are shown below. Additional staff and capabilities are available as needed to support the scope of work. This includes expertise in land surveying, transportation, geotechnical, stormwater, and water treatment.

CITY OF ORTING

Senior Project Manager	Principal Engineer
Scott Wilson, PE	Jeff Christner, PE

PROJECT TEAM		
WWTP Facility Planning, Evaluation & Design Review	**Construction Oversight & Inspection**	**Permitting & Funding**
Kenna Wurden-Foster, PE Eric Hull, EIT	Kenna Wurden-Foster, PE Steve Elliott	Thomas Gagliardi, EIT

SUPPORT TEAM			
Electrical	**Surveying**	**Structural**	**Geotechnical**
Brian Ziesmer, PE	Tom Brewster, PLS	Jack King PE, SE	Sean Cool, PE

ZTEK ENGINEERING

The Wilson Engineering project team will be joined as needed by Z-Tek for Electrical and Controls engineering and evaluation. Z-Tek has worked with Wilson Engineering on all wastewater facility projects for over 20 years and is very familiar with the design process. They are experts in the design of wastewater treatment electrical components including SCADA and Operation Controls. During the design process, Z-Tek will join the team in evaluating the instrumentation and controls, electrical system, SCADA, telemetry, programming, operations, and backup generator systems.

Scott Wilson and Jeff Christner are partners at Wilson Engineering and are dedicated to providing the City of Orting with quality service!

KEY PERSONNEL

Below are the key personnel that will be assigned to the project and their roles on the project. All of the key personnel assigned to City of Orting operate out of Wilson Engineering's office located at 805 Dupont St., Suite 7, Bellingham, WA 98225. The project team presented below has recently completed the design or construction phase for the Ferndale WWTP, Friday Harbor WWTP and Eastsound WWTP and can dedicate the amount of time necessary to guide the City of Orting through this project.

Scott Wilson, PE, will act at Senior Project Manager and is one of our experts in wastewater treatment facilities planning, design, funding, and permitting. Scott and Jeff work closely together on all projects to ensure success. Scott recently completed facility plans for Ferndale, Eastsound, Fisherman Bay, and Friday Harbor WWTPs. For all of these projects Scott acted as the Project Manager and completed the projects on time and within budget. Scott's experience on these projects will be directly applicable to City of Orting's wastewater system, specifically with his knowledge of wastewater process technologies, biosolids handling and planning, headworks design, pump stations, and construction management. Availability - 50%

Jeff Christner, PE, will act as Principal Engineer and is an expert in sewer and wastewater treatment facilities design, construction management, and operations and maintenance. Jeff brings his expertise in biosolids handling to this project. Jeff and Scott recently completed the design and construction management for the Ferndale WWTP and membrane bioreactor projects for Port Gamble and Bow Hill, and are also knowledgeable in nutrient removal, biosolids handling, and WWTP operations. Jeff has over 25 years of experience with wastewater treatment design that will make him valuable to the team. Availability - 40%

Kenna Wurden-Foster, PE will be part of the WWTP Facility Planning, Evaluation, and Design Review, and the Construction Oversight and Inspection for this project. Kenna has considerable experience with wastewater projects including the design of wastewater treatment plants and construction inspection. She recently worked under Jeff and Scott helping to manage the construction for the Ferndale WWTP upgrades and the design of the Friday Harbor WWTP. Availability - 40%

Eric Hull, PE will be part of the WWTP Facility Planning, Evaluation, and Design Review. Eric has experience in water system design, 3D modeling, sewer pump stations, and construction management that will be useful to the City of Orting's project. Availability - 50%

Thomas Gagliardi, EIT will assist Jeff and Scott with the Permitting and Funding tasks for this project. Tom has experience with wastewater regulations, environmental permitting, and wastewater project funding. Availability - 20%

Steve Elliot will be part of the Construction Oversight and Inspection. Steve just completed two years as a full-time inspector for the Ferndale WWTP upgrades. Availability - 80%

REFERENCES

City of Ferndale
Mike Olinger
Public Utilities Superintendent
mikeolinger@cityofferndale.org
(360) 384-4607

Eastsound WWTP
Jason Bradshaw
District Manager
(360) 376-2720

Town of Friday Harbor
Don Reitan
Wastewater Superintendent
Town of Friday Harbor
(360) 378-5400

Kitsap Public Utility District
Bob Hunter
Public Works Director
bob@kpud.org
(360) 779-7656

USIT Bow Hill WWTP
Brian Walker
(360) 399-9201

Lake Whatcom Water & Sewer
Bill Hunter
bill.hunter@lwwsd.org

PROJECT DESCRIPTION

Wilson Engineering has been in communication with the City of Orting since December about this project, leading to our team gaining a thorough understanding of the City's objectives and project goals. We understand that the City plans to upgrade its wastewater treatment facility, which consists of the following facilities: sequencing batch reactors, laboratory, control building, headworks screening and pumping facilities, among others. The project will involve the construction of a solids treatment and dewatering facility, which will eliminate the need for trucking Class B biosolids to Eastern Washington and reduce greenhouse gas emissions and accidental spill risks. The upgrade will include a screw press, cake bin, paddle dryer, bagging line, and additional upgrades as funding allows. An aerobic digestor may also be included if necessary. Headworks upgrades are also being considered if funding is available. Following our visit to the plant, we recommend improvements that encompass redundancy, bypass options, and improved screening in order to meet Ecology requirements. The project will be funded through a low-interest loan and local funds and is estimated to cost between $15 to $20 million dollars.

COST-EFFECTIVE APPROACH

Wilson Engineering has repeatedly provided our clients with cost-effective solutions, as illustrated in the table below. In the first six cases, we were brought in after other engineers had completed Facility Plans. We were able to value-engineer during the design phase and come up with solutions that dramatically cut the construction costs while also providing our clients with state-of-the-art and effective solutions.

PROJECT	TYPE OF PLANT	DESIGN FLOW, MGD (ADF / PDF)	ORIGINAL ESTIMATE (BY OTHERS)	TOTAL COST (DESIGN & CONSTRUCTION)
Moses Lake - Dunes	Extended Aeration	4.0 / 5.0	$18.0 Million →	$6.5 Million
Moses Lake - Larson	Extended Aeration	0.75 / 1.88	$12.7 Million →	$2.0 Million
Soap Lake WWTP	Oxidation Ditch	0.10 / 0.30	$3.5 Million →	$1.3 Million
Palouse WWTP	Extended Aeration	0.16 / 0.56	$5.7 Million →	$1.1 Million
Town of Wilbur WWTP	Conventional Activated Sludge	0.17 / 0.46	$4.1 Million →	$2.8 Million
Mattawa WWTP	Extended Aeration	0.60 / 1.5	$5.5 Million →	$2.8 Million
Goldendale WWTP	Extended Aeration	1.3 / 2.4	Planning by Wilson	$2.6 Million
Eastsound WWTP	Bardenpho 4-stage Activated Sludge	0.19 / 0.46	Planning by Wilson	$5 Million
Friday Harbor WWTP	Sequencing Batch Reactor (SBR)	0.42 / 1.44	Planning by Wilson	$14 Million
Bow Hill T	Membrane Bioreactor (MBR)	0.17 / 0.34	Planning by Wilson	$5.2 Million
Port Gamble WWTP	Membrane Bioreactor (MBR)	0.032 / 0.15-0	Planning by Wilson	$4.3 Million
Ferndale WWTP	Extended Aeration	3.2 / 11.1	Planning by Wilson	$33 Million

Our first step in the design of this project will be to work with City staff to identify goals, objectives, and key elements, as well as any constraints. We like to work with City staff as closely as possible to incorporate institutional knowledge as well as to keep on track with meeting all of the objectives of the City. We want to know what is working and what areas could use improvements as well as what tools, equipment, controls, and infrastructure would make operations simpler. We like to develop a close working relationship with plant operators to understand day-to-day operations and maintenance, so we can use our experience with other plants to make recommendations.

Wilson Engineering designs systems that are cost-effective to operate and maintain. It is important for a community such as Orting to keep operating costs low and avoid significant increases to sewer rates. Wilson Engineering designs wastewater facilities that are simple to maintain and provide operators the control and tools necessary to be effective. Our clients are always pleased with the minimal operations staffing and time required to run their plants, while also producing high quality effluent, easily meeting the NPDES permit requirements. Many of our plants have award-winning performance thanks to effective designs and straight-forward operations.

Wilson Engineering's project managers will take ownership of the City of Orting's WWTP Upgrade by defining a detailed scope, a realistic schedule, accurate cost estimate, and completing a thorough review of all designs. We will define the scope of work in detail, identify potential risks, and constantly review these during the project to ensure the project continues without surprises.

Regular project monitoring and reporting will be conducted to ensure that the project is progressing according to plan. We will establish a robust reporting structure that outlines project status, issues, risks, and proposed changes. Our project team will monitor the project's progress against the plan, identify deviations, and address them as needed. This approach helps to ensure that the project is delivered on time, within budget, and to the required quality standards, while minimizing the risk of change-related disruptions.

Scott and Jeff are experienced and dedicated to ensure quality in our approach by emphasizing effective and ongoing communication throughout the length of the project. Scott will continually reach out for feedback from the City, and regulatory agencies, to understand project needs, foresee problems, and provide guidance.

Wilson Engineering will do what it takes to make the project a success. We will coordinate with City of Orting staff on a regular basis to make sure we are meeting and exceeding expectations, oversee the individual efforts of each team member, ensure that our internal and overall schedules are met, oversee and direct the document preparation, ensure quality assurance/quality control, and track the budget. Drawing Plans, Specifications, Reports, and Cost Estimates are released only when we are satisfied that the content, tone, technical editing, and completeness meet our high standards for quality.


FERNDALE WWTP

This section provides detailed information on select recent projects, completed by the project team, that highlight our experience in wastewater planning and design for clients similar to the City of Orting.

PROJECTS | CITY OF FERNDALE - WASTEWATER PLANNING AND DESIGN

CLIENT CONTACT:

Mike Olinger
Public Utility Supervisor
Office: 360-384-4607
Cell: 360-815-1508
Kevin Renz
Public Works Director
Phone: 360-384-2736

KEY PERSONNEL:

Jeff Christner, PE, Sr Project Engineer: Facility Plan, WWTP Design, Pump Stations, Telemetry
Scott Wilson, PE, Project Engineer: Facility Plan, WWTP Design, Pump Stations
Kenna Wurden-Foster, PE

DESCRIPTION:

Sewer Comprehensive Plan (2010 and 2016):

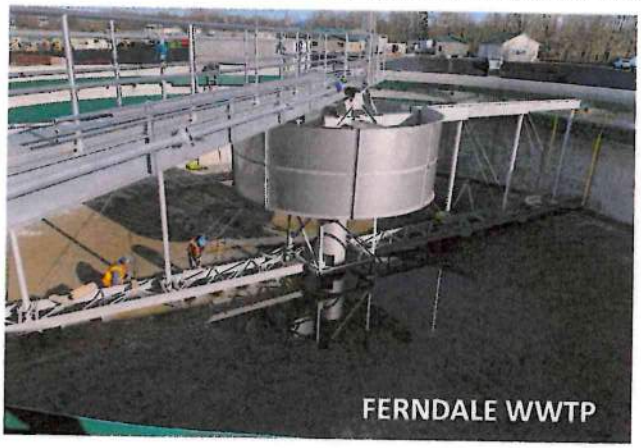
Prepared a complete Sewer Comprehensive Plan that included GIS mapping of the entire system, a hydraulic model of the system including 17 pump stations, assessment of all collection system and treatment plant infrastructure, pump station drawdown testing and capacity evaluations, quantifying current and future loads, capital improvement plans, infiltration and inflow assessment including flow measurement throughout the collection system, treatment capacity upgrade planning, and creating City Standards for pump stations. Implemented a biosolids land application program that cut solids handling costs in half. Project Costs = $125,000 and $90,000.

Wastewater Treatment Plant Facility Plan (2017):

This Facility Plan included an extensive review of existing facilities and various treatment technologies. Overall construction costs and operations costs were evaluated in detail to determine the most effective solution. The selected alternative was extended aeration to provide full-time nutrient removal and ability to add tertiary treatment if needed for reclaimed water. The Project also included evaluation of the existing lagoon system aerators, headworks, grit removal, settling basins, disinfection, and biosolids. The Plan included new headworks, extended aeration treatment, circular clarifiers, UV disinfection, and biosolids stabilization basins. Plant Capacity = 4.1 MGD ADF, 14.0 MGD PHF. Project Cost = $240,000. Sub-consultants: Electrical/controls Engineer.

Wastewater Treatment Plant Improvements (2018-ONGOING):

Designed and prepared bid document for the new Ferndale WWTP to be completed in 2021. The City's lagoon system was used for interim treatment. New treatment units include grit removal, mechanical fine screening (3 mm), two aeration basins, six positive displacement blowers, two 85-ft diameter clarifiers, high-intensity ultraviolet disinfection, effluent pump, 30-MGD Mixed Liquor pump station, internal collection and distribution pump station, actuated weir gates for flow control, provisions for influent flow bypass storage (during peak flow events), and facilities for long-term biosolids storage and digestion. In addition, design includes a new 2W water system and a new 3W water system for effluent reuse. Provided construction engineering, contractor oversight, and interim treatment engineering. Project Cost = $32,000,000. Sub-consultants: Electrical/controls Engineer, Geotech, Architect, and Biologist.


FERNDALE WWTP

Sewer Pump Stations Rebuild (2015 through 2017): Designed and prepared bid documents for replacements for the City's three largest sewer pump stations (~1,500 GPM). The main sewer pump station was also the most challenging from a design standpoint since it is sandwiched between the Nooksack River, BNSF Railroad tracks and Main Street. Provided construction engineering and oversight of contractor. Project Cost = $3,200,000. Sub-consultants: Electrical/controls Engineer, Geotech, Biologist.

Telemetry (2016): We provided consulting services for a radio study and design/bid/construction phase services for a new radio telemetry system for 17 City sewer pump stations. Sub-consultants: Electrical/controls Engineer. Project Cost = $200,000.

PROJECTS | TOWN OF FRIDAY HARBOR - WASTEWATER PLANNING AND DESIGN

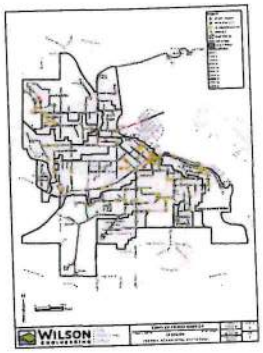
CLIENT CONTACT:
Don Reitan
Wastewater Superintendent
Town of Friday Harbor
360-378-5400

KEY PERSONNEL:
Scott Wilson, PE, Project Manager: Lead or Project Engineer for all Projects
Jeff Christner, PE, Project Engineer: Project Lead. Treatment System Evaluation
Kenna Wurden-Foster, PE

DESCRIPTION:

General Sewer Plan (2019):

This Plan included facilities inventory and assessments, GIS mapping, hydraulic modeling, capacity analysis, financial analysis, and a capital improvement program for future projects. Work also included smoke testing and flow monitoring assessments for a detailed infiltration and inflow study including developing a continuing I&I reduction plan. Acquired SRF Funding. Project Cost = $75,000.



Facility Plan (2018-2019):

Facility Plan included an extensive review of the existing treatment facility units and of upgrades using various treatment technologies. Overall construction costs, and operations costs were evaluated in detail to determine the most effective solution. The selected alternative was a conversion from SBR to conventional activated sludge treatment, adding external circular clarifiers, and upgrading biosolids handling system to provide full-time nutrient removal and the ability to add tertiary treatment if needed for reclaimed water. Project Cost = $140,000.

WWTP Upgrades (2017-2021):

Completed projects include: design and construction management for a new 1.44 MGD effluent filter and new headworks with grit removal, dual mechanical screens, improved flow monitoring, SCADA controls, and decant facility. Projects in design or construction include: a new sewer outfall, replacement of the existing SBR system with a conventional activated sludge plant, adding external circular clarifiers, expandable nutrient removal system, and upgrading the biosolids handling system. Acquired SRF Grant and Loan Funding. Plant Capacity 0.42-MGD ADF, 2.88-MGD PHF. Project Cost = $13,200,000 (estimated). Sub-consultants: Electrical/controls Engineer, Geotech.

Sewer Outfall Improvements (2018-2020):

Provided survey, engineering and permitting as design phase services for improvements to the Sewer Outfall into the harbor. Survey included both upland topo and bathymetric services. Design included replacing approximately 1,100 LF of old ductile iron pipe with up-sized HDPE pipe, including consideration and evaluation of both subsurface horizontal-direction drilling and above-surface anchored system. Design Cost = $150,000. Sub-consultants: Electrical/controls Engineer, Geotech, Biologist.

Sewer Pump Station No. 2 Rebuild:

Provided survey and engineering for pre-design, design, and construction Services for upgrades to Sewer Pump Station #2. Survey included boundary and topo services. Pre-Design included operational alternatives and pump options analysis. Design included rebuilding existing station, abandoning a wet well, converting a dry well to a wet well, odor control, new submersible pumps, new controls and wooden enclosure, flow metering, new discharge pipe valving, by-pass pumping ports, new force main (approx. 800 LF); and other site improvements, including stormwater drainage and yard hydrant. Project Cost = $700,000. Sub-consultants: Electrical/controls Engineer.

UW Friday Harbor Labs Pump Stations 1 and 2 Reconstruction:

Provided survey, permitting, engineering design, and construction administration for rebuilding two (2) University of Washington Friday Harbor Laboratories sewer pump stations. Survey included topographic survey and 3D scan of existing structures. Design included pump options analysis, modifying a dry well and a wet well, odor control, new submersible pumps, new controls, new generator, flow metering, new discharge pipe valving, bypass pumping ports, new force main piping and other site improvements within approximately 30 feet of marine shore. Pump stations are owned by UW and operated by the Town of Friday Harbor (Project was overseen by the Town). Project Cost = $780,000. Sub-consultants: Electrical/controls Engineer.

PROJECTS | EASTSOUND - WASTEWATER PLANNING AND DESIGN

CLIENT CONTACT:
Jason Bradshaw
General Manager
620-441-4006

KEY PERSONNEL:
Scott Wilson, PE, Project Manager: Co-Lead for all project work
Jeff Christner, PE, Senior Project Manager: Co-Lead for all project work
Brian Ziesmer, PE, Electrical Engineer

DESCRIPTION:

Wilson Engineering has worked with the Eastsound Water and Sewer District for over 37 years assisting them with wastewater treatment plant upgrades, planning reports, permitting, and funding.

Wastewater Treatment Plant Facility Planning and Design (2018-2020):

Most recently, we prepared a Comprehensive Sewer Plan, WWTP Facility Plan, and design for an expansion to their WWTP. Plant upgrades include the addition of nutrient removal to meet future DOE requirements, as well as fine-bubble aeration, clarifiers, headworks improvements, disinfection, digestor and FKC Screw Press. Acquired grants and loans. Project Cost = $4,000,000 (estimated). Sub-consultants: Electrical/controls Engineer, Geotech.

Wastewater Treatment Plant Outfall (2015):

Design services for new 10" discharge pipe with submerged ocean outfall. Project included mixing zone calculations and environmental considerations. Sub-consultants: Geotech and Biologist. Project Cost = $1,200,000 (estimated).

Class "A" Biosolids Dewatering Facility (2016):

Design services for a septage receiving station and wastewater solids handling equipment designed to produce Class "A" Biosolids. A New facility is engineered to fit within limited site constraints and to provide vehicle access throughout. In addition, the new facility will allow the operators to accept septage and convert all solids to a Class "A" Biosolids using a screw press. District revenue bonds were used for project funding (2013). Project Cost = $4,000,000 (estimated). Sub-consultants: Electrical/controls Engineer, Geotech.

PROJECTS | BOW HILL - MBR WASTEWATER TREATMENT PLANT DESIGN

CLIENT CONTACT:
Bob Hayden,
Corporate Project Manager,
USIT
360-724-0168

KEY PERSONNEL:
Jeff Christner, PE, Senior Project Engineer
Scott Wilson, PE, Project Engineer
Brian Ziesmer, PE, Electrical Engineer

SCOPE:
- Feasibility
- Permitting Analysis
- Surveying
- Final Civil Design
- Construction Services

DESCRIPTION:

Wastewater Treatment Design (2012): Feasibility Study, Design and Construction Management for water reclamation facility included site geotechnical research and subsurface hydrogeological evaluations. The new 200,000 gpd wastewater treatment plant (Ovivo MBR Water Reclamation Facility) consisted of equalization, mechanical screening, aerated grit removal, aerated sludge digestion units, UV disinfection, reuse water pump/distribution system, injection wells, and SCADA monitoring/alarm system.

UNIQUE CHALLENGES OF WORKING ON TRIBAL LANDS:

Working with the Upper Skagit Indian Tribe required special consideration of funding and permitting needs. The Wilson Engineering team worked closely with EPA and Indian Health Services to aid the Upper Skagit Indian Tribe through the entire project.

PROJECTS | CITY OF MOSES LAKE - TWO WASTEWATER TREATMENT PLANTS & COF HEADWORKS

CLIENT CONTACT:
Richard Law
Project Engineer
509-764-3782

KEY PERSONNEL:
Jeff Christner, PE, Senior Project Manager
Scott Wilson, PE, Design Engineer

SCOPE:
- Engineering Report
- Permitting
- Design
- Bid Phase Services
- Construction Services
- O&M Support

DESCRIPTION:

Wastewater Treatment Design (2004, 2013):

Wilson Engineering has performed multiple WWTP projects for the City of Moses Lake. This includes a 0.75 MGD plant (Larsen) at the north end of the City and a 4.0 MGD plant at the south end of the City (Dunes). We also designed headworks improvements at their Central Operations Facility including an equalization basin for emergency storage.

All projects included facility planning, design, bid phase services, construction management, and inspection. The upgrades consisted of two parallel aerated grit basins, two mechanical screen units, extended aeration basins capable of nitrification and denitrification, clarifiers, UV disinfection, and long term biosolids stabilization basins.

PROJECTS | PORT GAMBLE - MBR TREATMENT PLANT DESIGN

CLIENT CONTACT:
Bob Hunter
Public Works Director - KPUD
(360) 779-7656

KEY PERSONNEL:
Jeff Christner, PE, Senior Project Manager: Lead Engineer
Scott Wilson, PE, Design Engineer for Headworks Improvements

DESCRIPTION:

Wastewater Treatment Design (2004, 2013):

This project had a very tight schedule for design. Engineering report, permitting, and design for a complete wastewater treatment plant was completed in less than 6 months. Design consisted of a new 100,000 GPD MBR Package Plant with biosolids digestor and WAS thickening. $2,000,000 was procured in grant funding. Value engineering was required to fit within a DOH grant budget, and permitting the system as a Large On-site Septic System through DOH.

PROJECTS | STANWOOD BIOSOLIDS PROJECT

CLIENT CONTACT:
Grey Gilday
gildayg@gmail.com

KEY PERSONNEL:
Jeff Christner, PE, Senior Project Manager
Scott Wilson, PE, Project Manager
Brian Ziesmer, PE, Electrical Engineer

DESCRIPTION:

Wastewater Treatment Design (2015):

Engineering report, permitting, funding, and design for a Class A biosolids handling facility with a JWC Honey Monster Septage Receiving system, holding tank and pumping system for lime addition, FKC thickener, and FKC SHX-600 Screw Press. The facility was sized to process 40,000 gallons per day of biosolids or septage.

SCOTT WILSON, PE | PROJECT MANAGER, PARTNER

PROFESSIONAL QUALIFICATIONS:

Civil Engineering and Project Management for water and wastewater treatment facilities including treatment plant design, cost estimating, funding assistance, permitting, construction management, inspection, and plant operations and maintenance. Wastewater expertise also includes sewer pump stations, MBR and activated sludge technologies, headworks upgrades, UV disinfection, biosolids handling, and tertiary treatment. Additional expertise includes permitting, facility planning, and funding assistance.

SELECTED PROJECT EXPERIENCE:

Wastewater Treatment Plant Design and Comprehensive Planning, City of Ferndale, WA | Project engineer providing the City of Ferndale Wastewater Treatment Plant with planning, design, construction management, operations support, permitting and funding services for a new 4.1-MGD, 14.1-MGD PHF municipal wastewater treatment plant. Project included new headworks, aeration basins with nutrient removal, 85-diam clarifiers, UV disinfection.

Additional work consisted of preparing a Facility Plan, permitting, funding, construction management, and O&M manual.

Wastewater Treatment Plant Design and Comprehensive Planning, Town of Friday Harbor, WA | Project manager for various projects consisting of Design, Permitting, Funding, and Facility Planning. Projects included a new grit removal and screening headworks facility, tertiary treatment effluent filter system, biosolids handling improvements, and major treatment plant conversion from sequencing batch reactor (SBR) to a conventional activated sludge treatment process with nutrient removal.

Headworks improvements consisted of permitting, funding, planning, design, and construction management. Design elements included a new headworks building with dual fine screens, aerated grit settling basins, influent flow meter, manual bar screen, grit pump system, grit separation classifier, SCADA integration, site improvements and stormwater control, and grit decant structure.

Biosolids handling improvements consisted of permitting, funding, planning, and design. Planning efforts determined the most appropriate long term solution for biosolids handling. The recommended solution consists of taking their existing drum dryer offline and sending dewatered biosolids to the LaConner biosolids handling facility. Design for future improvements consists of replacing the dewatering belt press with a new centrifuge, conveying system, and sludge hauling container.

The treatment process conversion project consisted of planning, pre-design, permitting, and funding. Pre-design consists of the addition of a large equalization basin, replacing SBR basins with aeration basins, adding anoxic basins for nutrient removal, new clarifiers, UV system improvements, and blower replacement.

COF and Dunes WWTP Headworks Improvements, City of Moses Lake, WA | Project Engineer for facility planning, engineering report, and final design of two new 4 MGD headworks at the Central Operations Facility (COF) and Dunes WWTP. Both designs included 2 aerated grit basins, 2 mechanical screens, and bypass channel. The COF design also included a 800,000 gallon emergency storage basin. Responsibilities included preparing final Wastewater Treatment Facility cost estimate, plans, specifications, and associated bid documents; coordinating permitting and bid phase services; construction phase services, including reviewing construction submittals, responding to RFI's, and negotiating contract change orders.

Education: BS, Civil Engineering, Washington State University | **Professional Licenses:** PE, Washington, 2011 | **Career Began:** 2005 | **Joined Firm:** 2008 | **Expertise:** WWTP Design, planning, permitting, funding, construction management and operations.

JEFF CHRISTNER, PE | PRINCIPAL ENGINEER, QA&QC

PROFESSIONAL QUALIFICATIONS:

Civil Engineering and Project Management in water/wastewater facilities, including feasibility studies, final design, construction phase services for new WWTPs; design, construction management of water mains, sanitary sewers, pump stations, storm sewers, and road improvement; WWTP upgrades with denitrification and rapid infiltration; biosolids handling facilities and beneficial use permitting; advanced treatment MBR WWTP design.

SELECTED PROJECT EXPERIENCE:

WWTP Expansion and Facilities Planning, City of Ferndale, WA | Project Manager for the design of the new 4.1 MGD (max month flow) extended aeration, activated sludge Wastewater Treatment Facility. Treatment design target = less than (or equal to) 30 mg/L TSS, 25 mg/L BOD, 8 mg/L TN, and 28 fcu/100mL. New treatment system will include two aerated grit removal basins, two 3 mm rotary drum style fine screens, two aerations basins with fine bubble diffusers, two 85' diameter x 15' SWD clarifiers, UV disinfection, and conversion of an existing lagoon to a long term biosolids storage basin.

Project includes a new Lab/Administration Building, a new UV/Maintenance Building, and conversion of the existing Chemical Building into the Blower Building. Responsible for preparing final cost estimate, plans, specifications, and associated bid documents. Obtained funding for both design and construction through Ecology's low interest SRF loans. Responsible for coordinating bid phase services.

Planning phases included facilities plan, cost effectiveness analysis, and environmental permit coordination for the evaluation and proposed improvements to the City's wastewater treatment plant.

Membrane Bioreactor WWTP, Port Gamble (Kitsap PUD), WA | Project Manager for conceptual design, and final design of the new 100,000 gpd MBR Wastewater Treatment Facility. Treatment design target = Class A Reclaimed Water. Responsible for preparing final cost estimate, plans, specifications, and associated bid documents, coordinating bid phase services for multiple contract packages, including the membrane treatment equipment, mechanical screening equipment, generator equipment, facility site work, construction phase services, including reviewing construction submittals, responding to RFI's, and negotiating contract change orders.

COF Headworks Improvements, City of Moses Lake, WA | Project Manager for facility planning, conceptual design, and final design of the new 4 MGD Central Operations Facility (serving the south side of the City of Moses Lake, WA). Design included two aerated grit basins, two mechanical screens, bypass channel, and a 800,000 gallon emergency overflow storage basin. Responsible for preparing final Wastewater Treatment Facility cost estimate, plans, specifications, and associated bid documents; coordinating bid phase services; construction phase services, including reviewing construction submittals, responding to RFI's, and negotiating contract change orders.

Sand Dunes (5.76 MGD) Wastewater Treatment Plant Upgrade, City of Moses Lake, WA | Project Engineer: Provided Facility planning, conceptual design, and final design of the new 5.76 MGD Dunes WWTP (serving the south side of the City of Moses Lake, WA). Responsible for preparing final Wastewater Treatment Facility cost estimate, plans, specifications, and associated bid documents; coordinating bid phase services; and for construction phase services, including supervision of field inspection crews, reviewing construction submittals, responding to RFI's, and negotiating contract change orders.

Education: BS, Civil Engineering, Texas A&M University, 1995 | **Professional Licenses:** PE, Washington, 2000; Oregon, 2015 | **Career Began:** 1995 | **Joined Firm:** 1997 | **Affiliations and Community Service:** Bellingham Technical College Advisory Committee | **Relevant Expertise:** WWTP upgrades with denitrification, rapid infiltration, biosolids handling facilities, and beneficial use permitting; flexible WWTP expansions integrated into initial phase with straight forward configuration for future expansion; challenging WWTP construction scheduling; advanced treatment designs compliant with Class A Reclaimed Water Standards and/or Primary Drinking Water Standards.

KENNA WURDEN-FOSTER, PE | ENGINEER II

PROFESSIONAL QUALIFICATIONS:

Kenna has experience with civil engineering for water and wastewater projects, including the design of wastewater treatment plants, drinking water treatment facilities, well pumps and well houses. Kenna has specific experience with membrane bioreactors, wastewater treatment with nitrification and denitrification, and wastewater treatment with biological and chemical phosphorus removal.

SELECTED PROJECT EXPERIENCE:

Wastewater Treatment Plant Headworks Replacement, Town of Friday Harbor, WA | Provided inspection services for construction of grit chambers, headworks channels and buildings, decant facility drying pad and shelter, and associated piping. Responsibilities included daily inspection reports and monitoring construction quality assurance. Compiled Operation and Maintenance Manual to summarize operation and maintenance of new headworks process and equipment.

Wastewater Treatment Plant Biosolids Handling, Town of Friday Harbor, WA | Reviewed equipment proposals for sludge conveyors, including belt, shafted screw, and shaftless screw conveyors. Provided assistance in writing engineering report, including summarizing equipment proposals and making a recommendation regarding sludge conveyors.

Wastewater Treatment Plant Upgrade, Town of Friday Harbor, WA | Helped with design to upgrade existing WWTP from a sequencing batch reactor (SBR) to a treatment system with increased capacity and nitrogen removal. Specifically assisted with the design of the UV disinfection system and the upgraded biosolids handling building.

Wastewater Treatment Plant Improvement Engineering Report, Eastsound, WA | Provided assistance in writing engineering report, including addressing comments from Ecology. Helped analyze and discuss options to upgrade the facility's existing extended aeration facility, including adding a third extended aeration cell, converting the facility to a membrane bioreactor (MBR) process, adding an MBR process in addition to the existing facility, and adding integrated fixed film activated sludge) (IFAS) modules to the existing basins.

Wastewater Treatment Plant Engineering Report, Roche Harbor Resort, WA | Helped write engineering report. Described and evaluated the existing facility in terms of process flow, existing equipment, and treatment capacity. Helped discuss options to upgrade the facility's existing extended aeration facility, including converting the facility to a membrane bioreactor (MBR) process, and making minor upgrades to the existing equipment and processes.

Wastewater Treatment Plant Outfall Dechlorination System, City of Blaine, WA | Helped with design of the dechlorination system for wastewater treatment plant outfall, including researching dechlorination chemical options, calculating chemical dose requirements, and investigating storage and handling options at the existing effluent pump station.

Wastewater Treatment Plant Upgrade, City of Ferndale, WA | Helped with design, drawings, and specifications for the wastewater treatment plant upgrade project. Upgrades include a new headworks facility, extended aeration lagoons, clarifiers, UV disinfection, a biosolids storage lagoon, and various new buildings for operations and maintenance. Prepared and submitted successful applications for permits, including land disturbance, construction stormwater, and building permits. Provided construction inspection and onsite engineering services, including reviewing submittals, fielding requests for information, and assisting with Contractor pay application processing.

Education: University of Washington, M.S. Civil and Engineering, 2014; University of Washington, B.S. Civil and Environmental Engineering, 2013 | **Professional Licenses:** PE, Washington, 2018 | **Career Began:** 2015 | **Joined Firm:** 2018 | **Expertise:** Engineering: Wastewater treatment and conveyance, biosolids handling, booster pump stations, and drinking water conveyance. Construction inspection.

ERIC HULL, EIT | DESIGN ENGINEER

PROFESSIONAL QUALIFICATIONS:

Civil Engineering and Project Management, with experience in water and wastewater treatment plant design, water system design and analysis, and construction administration.

SELECTED PROJECT EXPERIENCE:

WASTEWATER

Town of Friday Harbor Waste Water Treatment Plant Upgrades, Friday Harbor, WA | Project Engineer: Design and draft updates to the waste water treatment plant.

Town of Friday Harbor Waste Water Treatment Plant Outfall Replacement, Friday Harbor, WA | Project Engineer: provide engineering support during the construction of the offshore outfall.

Valencia Water Reclamation Plant Tertiary Treatment Expansion Engineering Support During Construction, Santa Clarita, CA | Project Engineer: Provide engineering support during the construction of the water treatment plant expansion.

WATER AND WATER TREATMENT

Upper Skagit Indian Tribe, Sedro-Wooley, WA | Project Engineer: Design dedicated reservoir fill line and bring design drawings from 30% to 100% complete.

Bakerview Terrace Community Club, Camano Island, WA | Project Engineer: Capacity analysis of the BTCC water system to determine feasibility of additional connections.

Lummi Island Scenic Estates Community Club, Lummi Island, WA | Project Engineer: Capacity analysis of the LISECC water system to determine feasibility of additional connections.

Lake Whatcom Water and Sewer District Water Use Efficiency Plan, Bellingham, WA | Project Engineer: Analysis of water consumption data and preparation of report.

Chino II Desalter Secondary RO Facility Operations Support, Ontario, CA | Project Engineer: Provide operations and support and develop data management tool for streamlined quarterly reporting.

Lee County Utilities North Water Treatment, North Fort Myers, FL | Project Engineer: Design updates to the water treatment plant from 10 MGD to 15 MGD.

South Island Public Service District, Hilton Head, SC | Project Engineer: Provide conception models of water treatment plant layouts for various properties owned by the district.

Education: BS, Environmental Engineering, Montana Technological University, 2016; MS Environmental Engineering, Montana Echnological University, 2017 | **Professional Licenses:** EIT, Montana, 2016 | **Career Began:** 2019 | **Joined Firm:** 2021 | **Expertise:** Engineering: Wastewater and Water Design, Project Management, Hydraulic Modeling, GIS mapping, and Construction Administration.

STEVE ELLIOTT | LEAD INSPECTOR

PROFESSIONAL QUALIFICATIONS:

Steve has 12 years of experience as a field and laboratory inspector. He has supported numerous infrastructure projects in several states including California, Washington, Colorado, Michigan, Ohio, West Virginia, and Florida. He has the proper management, communication, interpersonal, cooperation, and leadership skills as well as the knowledge and ability for reviewing and understanding blueprints, models, and technical plans. He offers expertise in the proper methods, tools, and materials needed for the construction or repair of buildings, structures, roadways, pipelines, and wastewater treatment plants. Steve has experience with a broad variety of projects, including: water and wastewater, refineries, large-scale commercial paving, highway expansions and infrastructure, casinos, fire stations, public school expansions, and even a race track. He is proficient with inspection and materials testing of soils, concrete, asphalt, and rebar. Steve is also highly experienced with the general inspection and construction of roadways, bridges, pipelines, and wastewater treatment plants.

SELECTED PROJECT EXPERIENCE:

Wastewater Treatment Plant Upgrade, City of Ferndale, WA | Provided the City of Ferndale with full time inspection services for over two years on the ~$30M upgrade to the existing wastewater treatment facility. Tasks performed included general inspection for civil, structural, mechanical, and architectural features associated with the project. Worked closely with project engineers to process and investigate change orders, credits, RFIs, and submittals. Served as direct daily contact for the City of Ferndale plant operators and managers.

WSDOT SCR General Engineering Consultant, Yakima, WA | Provided general engineering consultant services for WSDOT South Central Region during four paving seasons from March-November 2016-2019. Roles and responsibilities were those primarily focusing on field inspections of highway and bridge construction from Snoqualmie Pass to the Tri-Cities area. Completed tasks associated with laboratory testing of various materials as well as performing services as an instrumentation operator for a WSDOT survey crew.

Recycled Water Pipelines and Wastewater Treatment Plant, City of Tracy, CA | Provided general inspection services during the installation of approximately 5,900 lineal feet of 30-inch recycled iron ductile pipe and 17,400 lineal feet of 24-inch recycled iron ductile pipe for use as water transmission mains. The scope of work covered all phases of construction: pre-construction meetings, mobilization, pot-holing to locate utilities, traffic control installation, trenching, pipe laying and insulation, cathodic protection installation, backfilling of trenches, paving, and general safety of the work crews as well as the general public. Provided detailed reports, updated as-built drawings, met daily with representatives from the general contractor, City of Tracy engineers, and San Joaquin County inspectors, coordinated materials testing with subcontractors, and communicated frequently with mechanical and civil engineers to resolve discrepancies.

Education: General Studies, Bakersfield College, Bakersfield, CA | **Professional Licenses:** WAQTC EBTT, AGG, Asphalt II, ACI | **Career Began:** 2010 | **Joined Firm:** 2020

Brian Ziesmer, P.E.

Electrical and Control Systems Engineer

Mr. Ziesmer serves as the President and Principal Engineer for ZTEK Engineering. He has more than 25 years of electrical engineering design experience, including power distribution systems, interior and exterior lighting, motor control, control system design system and programming.

EDUCATION:
BSEE – Washington State University, 1991

PROFESSIONAL REGISTRATION:
Electrical Engineer – WA, OR, ID, CA
Control Systems Engineer – WA, OR, ID, CA

EXPERIENCE:
Commercial, Industrial and Municipal industries

REPRESENTATIVE PROJECT EXPERIENCE — WASTEWATER:

City of Moses Lake, Dunes and Larson WWTP Upgrades – Dunes: This project included the design and construction for upgrades at the wastewater treatment facility. A new 480 volt, 1200 amp electrical service with a 350 kW standby generator system was installed. The new control building included five new 75 HP blowers, two controlled by VFD's. A new vehicle storage building was constructed, including a Fire Pump system and water reservoir. The project also included an SCADA monitoring via radio telemetry, intercom, PA and telephone communications system. Larson: Engineering design for power, instrumentation and telemetry for the City's new Larson Wastewater Treatment Plant. The design of the new WWTP included a new electrical service and a standby generator system. Conduit, receptacles and facility lighting was designed and specified, as well as requirements for the SCADA software design, including graphical screens for all sites, alarm monitoring and report generation.

Upper Skagit Indian Tribe, Bow Hill Water Reclamation Facility – Project includes the land development and construction of a new facility for waste water treatment. The treatment systems include Membrane Bioreactor (MBR) and Membrane Thickening (MBT) systems. A new 480V three phase service was extended to the new control building. Power distribution includes a 200 kW diesel generator and automatic transfer switch, motor control centers, control panels, lighting and HVAC. The treatment system also includes various pumping stations, fine screen, and UV disinfection equipment. A PLC based control system was designed to control the facility and process, including a Wonderware SCADA system for control, monitoring and report generation.

Port Gamble, MBR Wastewater Treatment Plant – Improvements included the integration of a new Membrane Bioreactor (MBR) treatment plant and collection pump station. The new pump station included a suction pump station located at grade with duplex 10 HP pumps, controls and instrumentation. The WWTP improvements consisted of a new operations building, anoxic basin and MBR treatment system, plant drain pump station, and UV effluent disinfection system. The project included coordination with the local electrical utility for a 480V three phase line extension to the collection pump station, and installation of a 100 kW diesel generator and automatic transfer switch. The design included power distribution, lighting, controls and instrumentation, and coordination for the installation of multiple packaged systems into one integrated treatment system.

City of Ferndale, WWTP Upgrade – This project included planning, design and construction for upgrades at the wastewater treatment facility. A new 480 volt, 1200 amp electrical service with a 350 kW standby generator system was installed. The new control building included five new 75 HP blowers, two controlled by VFD's. The project also included an SCADA monitoring via radio telemetry, intercom, PA and telephone communications system.

Purchase Order

City of Orting

Small Town/Big View

Date: 15-Jun-23

P.O. #: 3907

Sales order 06/02/2023

Pay To:

TEC Equipment, Inv.
52619 Pacific hw S
Des Moines, WA 98198
Phone: (206) 764-3833 Fax: (253) 529-0258

Requested By:	Payment Details	Received Date:
Bielka	Net-30 Days	

Qty	Item #	Description	Job	Unit Price	Line Total
1.00	Stock# MMS1120	MACK 2024 MD6		$ 124,750.00	$ 124,750.00
1.00		Title & Lic		$ 35.00	$ 35.00
1.00		Docm.Svc Fee		$ 200.00	$ 200.00
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -
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				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -
				$ -	$ -

Subtotal	$ 124,985.00
Sales Tax	12,974.00
Total	**$ 137,959.00**

Please send all invoices by mail or email to:
City of Orting, Public Works Dept.
PO Box 489
Orting, WA 98360
lhinds@cityoforting.org

Department Description:	*Authorized by*	*Date*
BARS:	*Authorized by*	*Date*

Shipping Address:
City of Orting Public Works, 900 Rocky Rd NE, Orting, WA 98360 P (360) 893-2219 F (360) 893-0408

SALES ORDER

TEC Equipment, Inc.
25619 Pacific Hwy S
Des Moines, WA 98198
206.764.3833 ph
253.529.0258 fx
www.tecequipment.com

CITY OF ORTING PUBLIC WORKS			06/02/23
PURCHASER			DATE
110 BRIDGE STREET SE			3907
STREET ADDRESS			PURCHASER ORDER
ORTING, WA 98360			
CITY, STATE ZIP			QUOTE NUMBER
(253) 263-3205		sdaskam@cityoforting.org	*JOEL DI PIETRO*
PHONE	FAX	EMAIL	SALESPERSON

ENTER MY ORDER FOR THE FOLLOWING MOTOR VEHICLE(S) AS DESCRIBED BELOW

(#1) STOCK #	MMS1120	NEW / USED>	NEW	MILEAGE	
YEAR	2024		MAKE	MACK	
MODEL	MD6	25,995 LBS GVWR	VIN#	1M2MDBAAXPS005595	
SALES PRICE	$	124,750.00	FET	0.00	
APU / REEFER					
EXTENDED WARRANTY					
PURCHASED COVERAGE					
(#2) STOCK#		NEW / USED>		MILEAGE	
YEAR			MAKE		
MODEL			VIN#		
SALES PRICE			FET	0.00	
APU / REEFER					
EXTENDED WARRANTY					
PURCHASED COVERAGE					

Options / Instructions **BODY: HENDERSON 5-7 YD HYDAULIC DUMP BODY**
ENGINE: CUMMINS B6.7 300HP/660 LB-FT
TRANS: ALLISON 2500 RDS 6 SPEED AUTO w/PTO PROVISION
GAWR: 10,000 lb. FRONT - 19,000 lb. REAR
SUSPENSION: MULTILEAF SPRING

LESSEE NAME / DBA			
ADDRESS / CITY, ST ZIP			
UNIT 1 - FET EXEMPT? YES or NO	YES	WA STATE SALES TAX EXEMPT? YES or NO	NO
UNIT 2 - FET EXEMPT? YES or NO		**Sales Tax Exemption:** Resale / Non Resident / ICC "Out of State" Delivery / Non-Profit.....Enter Here >	

LIEN HOLDER	
ADDRESS	

PURCHASER AGREES THAT NO RELIANCE IS BEING MADE ON VERBAL STATEMENTS REGARDING THE CONDITION OR PERFORMANCE OF THE ABOVE-DESCRIBED VEHICLE(S), INCLUDING STATEMENTS AS TO THE SERVICE HISTORY OF SAID VEHICLE(S). PURCHASER HAS INSPECTED AND/OR TEST DRIVEN SAID VEHICLE(S) AND THE DECISION TO PURCHASE IS BASED TOTALLY ON THIS INSPECTION AND/OR TEST DRIVE. ABOVE VEHICLE(S) SOLD "AS IS-WHERE IS". NO WARRANTY OR GUARANTEE IS OFFERED OR IMPLIED. New Equipment is sold with Manufacturer's Full Warranty. Used equipment is sold as is and without warranty of merchantability or otherwise except as specified above.

Purchaser further agrees that this Order includes all of the Terms and Conditions on both the face and reverse side hereof, that this Order cancels and supersedes any prior agreement and as of the date hereof comprises the complete and exclusive statement of the terms of agreement and that THIS ORDER SHALL NOT BECOME BINDING UNTIL ACCEPTED BY DEALER'S AUTHORIZED REPRESENTATIVE. PURCHASER BY THE EXECUTION OF THIS ORDER ACKNOWLEDGES THAT HE HAS READ ITS TERMS AND CONDITIONS AND HAS RECEIVED A TRUE COPY OF THIS ORDER.

SALES PRICE	$ 124,750.00
FEDERAL EXCISE TAX	$ -
STATE & LOCAL TAXES (10.4%)	$ 12,974.00
EXTENDED WARRANTY	$ -
NON-VEHICLE SALES TAX (10.1%)	$ -
TITLE & LICENSE FEES	$ 35.00
NEGOTIABLE DOCUMENTARY SVC FEE	$ 200.00
TOTAL PRICE PER ORDER	$ 137,959.00
TOTAL x (# ORDERS) 1	**$ 137,959.00**
STATEMENT OF DOWNPAYMENT (more than one trade-in use Schedule A)	
TRADE IN ALLOWANCE	
BALANCE OWED ON TRADE	
MAKE OF TRADE-IN	
YEAR MODEL	
STOCK# BODY	
VIN #	
TRADE PAYOFF BALANCE OWED TO	
Purchaser hereby agrees to be bound by the terms and conditions	
to trade-in vehicles per attachment 'A' hereto, except as follows	
Initials:	
TOTAL TRADE-IN ALLOWANCE(S)	$0.00
TOTAL BALANCE OWED ON TRADE-IN(S)	$0.00
CASH REFUND TO CUSTOMER	
NET ALLOWANCE ON TRADE-IN(S)	$0.00
CASH DOWN PAYMENT	
TOTAL DOWN (TRADES + DOWN PMT)	**$0.00**
BALANCE DUE ON DELIVERY	**$ 137,959.00**
ESTIMATED DELIVERY DATE	IN STOCK
X PURCHASER	DATE
SALESMAN	DATE
ACCEPTED BY	DATE

** SALES ORDER NOT VALID UNLESS SIGNED BY AN AUTHORIZED SALES MANAGER **