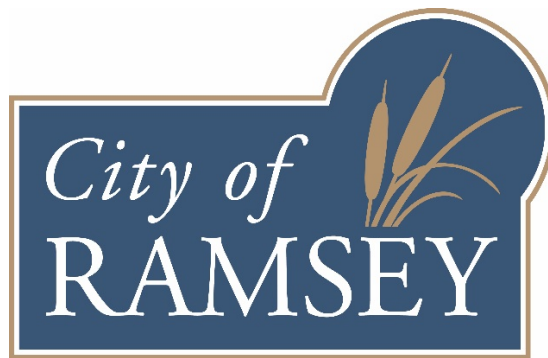


FEASIBILITY REPORT

2020 PAVEMENT OVERLAY IMPROVEMENTS

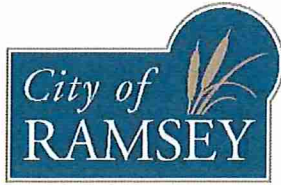
CITY IMPROVEMENT PROJECT NO. 20-02



February 20, 2020

Prepared By:

City of Ramsey
Engineering Department
7550 Sunwood Drive NW
Ramsey, MN 55303
763-433-9839
763-433-9848 (Fax)



February 20, 2020

Honorable Mayor and City Council
City of Ramsey
7550 Sunwood Drive NW
Ramsey, MN 55303

Re: Feasibility Report – City of Ramsey Improvement Project #20-02
2020 Pavement Overlay Improvements

Dear Mayor and City Council Members:

Transmitted herewith is a Feasibility Report for the proposed 2020 Pavement Overlay Improvements, Improvement Project No. 20-02.

The report examines the feasibility of completing 2-inch bituminous pavement mill and overlay improvements on approximately 19,612 square yards of bituminous pavement on 1.51 miles of public streets in three residential neighborhoods within the City, and necessary appurtenant improvements.

This Feasibility Report examines the scope of the proposed improvements, explores estimated costs and available funding sources, defines a preliminary project schedule, and determines the necessity, feasibility and general cost-effectiveness of the proposed improvements, including any alternate designs, as well as whether the improvements would best be completed separately or in conjunction with another project.

I would be happy to discuss this report with you at your convenience. Please feel free to contact me at 763-433-9825 or bwestby@cityoframsey.com with any questions.

Sincerely,
City of Ramsey

A handwritten signature in black ink that reads "Bruce Westby". The signature is written in a cursive, flowing style.

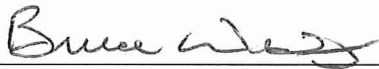
Bruce Westby, PE
City Engineer

Enclosure

C: Kurt Ulrich, City Administrator
Joe Feriancek, Civil Engineer II

CERTIFICATION

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

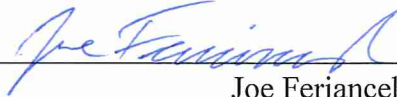


Bruce Westby, PE

Date: February 20, 2020

License No. 40116

I hereby certify that this plan, specification or report was reviewed for Quality Control and Quality Assurance purposes and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.



Joe Feriancek, PE

Date: February 20, 2020

License No. 57095

TITLE SHEET
LETTER OF TRANSMITTAL
CERTIFICATION SHEET
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Appendix A

- Project Scope – Klemish, Klemish & Flores
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- Opinion of Probable Costs

Appendix C

- Street Segment Summary

Appendix D

- WSB Pavement Forensics Report

1. EXECUTIVE SUMMARY

City Improvement Project 20-02 proposed to complete 2-inch bituminous pavement mill and overlay improvements to numerous public street segments within the City of Ramsey, including other associated appurtenant improvements as outlined in this report. Approximately 19,612 square yards of bituminous pavement on 1.51 miles of public streets in the City were proposed to receive bituminous pavement overlay improvements in 2020 per the City's 10-Year Capital Improvement Program (CIP). The street segments are located in the residential neighborhoods of Klemish, Klemish & Flores, Sunfish Square, Sunfish Square 2nd, Windemere Woods, and Windemere Woods 2nd.

Appendix A includes exhibits showing the proposed project areas.

City Staff typically rates the pavement sections of all city streets on an annual basis using the Pavement Surface Evaluation and Rating (PASER) system. The last three years of PASER rating for each street segment proposed to receive an overlay with this project is included in the street segments summary found in *Appendix B*.

On December 10, 2019, the Ramsey City Council ordered this feasibility report which explores the necessity, feasibility and cost-effectiveness of the proposed improvements by examining the scope of the improvements, exploring estimated costs and available funding sources, and determining whether the improvements should be completed as proposed or in connection with other improvements.

After determining a standard 2" mill and overlay project would not be feasible, City Staff explored a 3.5" full-depth mill and new pavement as well as a full-depth reclamation (FDR) project for the proposed street segments.

City Staff hired WSB to perform pavement forensics for the proposed project areas, these findings are discussed in section 3 of this report, and is found in *Appendix D*. Based on those findings Staff investigated completing a 3.5" full-depth mill and overlay, and a FDR of the proposed areas. Both improvements are more involved than a 2" mill and overlay, but would be necessary since the existing pavement is, in general, beyond a standard mill and overlay, and the City would not get a maximum benefit out of such a project in this situation.

The engineer's opinion of probable costs for the 3.5" full-depth mill and overlay is \$834,850.50. The engineer's opinion of probable costs for the FDR is \$811,221.59. Estimated costs include 10% contingency costs, plus 14% indirect costs for administrative, engineering, finance and legal costs.

The improvements proposed with this project are identified in the City's current 10-year Capital Improvement Program, and can be funded using a combination of Road Reconstruction Funds,

special assessments to benefitting properties, and Stormwater Funds. *Appendix C* includes a detailed opinion of probable costs.

The proposed improvements were not found to be feasible and cost-effective from an engineering standpoint, and Staff does not support construction of the 2020 bituminous overlays as proposed herein. The proposed street segments would be most cost-effectively reconstructed after such time as their PASER ratings fall to a 3 or below. Instead, Staff recommends reviewing the current CIP to identify other street segments for 2020 mill and overlay improvements based on available funding, and authorizing Staff to prepare a new Feasibility Report for proposed 2020 mill and overlay improvements under City Improvement Project No. 20-02.

2. INTRODUCTION

2.1 Authorization

Preparation of this feasibility report was authorized by the Ramsey City Council on December 10, 2019

2.2 Program Overview

This project is designated as 2020 Pavement Overlay Improvements, Improvement Project No. 20-02.

This feasibility report explores proposed bituminous pavement mill and overlay improvements to approximately 19,612 square yards of public streets within several residential neighborhoods of the City. The street segments were proposed to receive 2-inch bituminous mill and overlay improvements. Associated appurtenant improvements were also proposed to be completed as necessary and as outlined in this report.

Maps showing the scope of the proposed improvements are included in *Appendix A*.

2.3 Scope

The scope of this report addresses proposed mill and overlay improvements to approximately 19,612 square yards of public streets within several residential neighborhoods of the City as shown in *Appendix A*.

After determining a standard 2” mill and overlay project would not be feasible, City Staff explored a full-depth 3.5” mill and new pavement, as well as a FDR project for the proposed street segments.

3. EXISTING CONDITIONS

3.1 Existing Streets

3.1.a Klemish, Klemish & Flores neighborhood

The existing right-of-ways along the street segments proposed in the 10-year CIP to receive overlays as part of this project generally are 66-feet in width. The paved street width is 24-feet as measured from the edge of bituminous. All streets in this project were constructed as a rural section, with bituminous pavement and ditches.

The streets segments proposed to receive overlays in 2020 have 2018 PASER ratings of 5, with the exception of Sodium Street which had one section of pavement with a 2018 PASER rating of 8. In 2019 these PASER ratings fell to 3, with the exception of Sodium Street which half the street was rated a 4 and the other half 5. Staff determined this neighborhood was structurally beyond an overlay improvement, with the exception of Sodium Street.

WSB was employed to complete a pavement forensics, which included pavement corings of the proposed overlay street segments. This included 2 corings on Sodium Street; both cores were in poor condition, which showed degradation and deterioration. The WSB pavement forensics report is included in *Appendix D* of this report.

Based on the manner in which the existing pavement is deteriorating, Staff does not support completing an overlay improvement for the Klemish and Klemish & Flores neighborhood. The existing streets are still serviceable with moderate maintenance patching. Staff recommends not completing a more involved full-depth reclamation (FDR) or reconstruction project at this time.

3.1.b Sunfish Square, Sunfish Square 2nd neighborhood

The existing right-of-ways along the street segments proposed in the 10-year CIP to receive overlays as part of this project generally are 60-feet in width. The paved street width is 31-feet as measured from the back-of-curb. All streets in this project were constructed with bituminous pavement and concrete curbing, and many of the street segments contain storm sewer.

The street segments proposed to receive overlays in 2020 in the Sunfish Square and Sunfish Square 2nd subdivisions had 2017 PASER ratings of 7, and 2018 PASER ratings of 5. Staff did not rate these street segments in 2019. When visually inspecting the street segments in December, Staff felt there would be several areas which would require full-depth patching, and the overlay would likely have high amounts of reflective cracking.

WSB was employed to complete a pavement forensics, which included 6 pavement corings spread out among the street segments. Of the 6 corings, 4 were in good condition, 1 was starting to show signs of deterioration, and 1 was in poor condition showing deterioration. The bituminous depth ranged from 2 to 3-inches thick, with 3.5 to 4.5-inches of aggregate below.

The WSB pavement forensics report is included in *Appendix D* of this report.

The street segments were all constructed in 1994 through 1995, and in their 25 to 26-year lifespan have received 3 sealcoats and no overlays. Most of the streets within this neighborhood would still be a candidate for an overlay, in conjunction with full-depth patching, but not all. Staff does not recommend selectively completing overlay improvements on street segments within the same neighborhood, and does not support completing an overlay improvement on the Sunfish Square and Sunfish Square 2nd neighborhoods at this time. With the limited financial resources of the City, Staff recommends maintaining the existing streets until such time as they have degraded to a level requiring reconstruction.

3.1.c Windemere Woods, Windemere Woods 2nd neighborhood

The existing right-of-ways along the street segments proposed in the 10-year CIP to receive overlays as part of this project generally are 60-feet in width. The paved street width is 31-feet as measured from the back-of-curb. All streets in this project were constructed with bituminous pavement and concrete curbing, and many of the street segments contain storm sewer.

The street segments proposed to receive overlays in 2020 in the Windemere Woods and Windemere Woods 2nd subdivisions had 2017 PASER ratings of 8, 2018 PASER ratings varied from 5 to 8, and 2019 ratings varied from 3 to 7. When visually inspecting the street segments in December, Staff felt there were large areas which would require full-depth patching, particularly Magnesium Street, which would require several hundred feet of full-depth patching and full curb and gutter replacement.

WSB was employed to complete a pavement forensics, which included 4 pavement corings spread out among the street segments. Of the 4 corings, 2 were in good condition, 1 was in poor condition showing deterioration, and 1 was in very poor condition being severely deteriorated. The bituminous depth ranged from 2 to 3.25-inches thick, with 4 to 4.5-inches of aggregate below. The WSB pavement forensics report is included in *Appendix D* of this report.

The street segments were all constructed in 1992, and in their 28-year lifespan have received 3 sealcoats and no overlays. Half of the streets are well beyond overlay improvements, while the other half could still be overlaid with bituminous patching. Staff does not recommend selectively completing overlay improvements on street segments within the same neighborhood, and does not support completing overlay improvements on the Sunfish Square and Sunfish Square 2nd neighborhoods at this time. With the limited financial resources of the City, Staff recommends maintaining the existing streets until such time as they have degraded to a level requiring reconstruction.

3.2 Utilities

3.2.a Watermain

Watermain exists under all streets within the Sunfish Square, Sunfish Square 2nd, Windemere Woods, and Windemere Woods 2nd neighborhoods. No improvements to the watermain is proposed in conjunction with this project. Watermain does not exist under any of the streets within the Klemish, and Klemish & Flores neighborhoods.

3.2.b Sanitary Sewer

Sanitary Sewer exists under all the streets within the Sunfish Square, Sunfish Square 2nd, Windemere Woods, and Windemere Woods 2nd neighborhoods. No improvements to the sanitary sewer is proposed in conjunction with this project. Sanitary Sewer does not exist under any of the streets within the Klemish, and Klemish & Flores neighborhoods.

3.2.c Storm Sewer/Drainage

Storm sewer exists under several of the streets within the Sunfish Square, Sunfish Square 2nd, Windemere Woods, and Windemere Woods 2nd neighborhoods, but it is not proposed to complete any significant repairs or storm sewer construction as part of this project. Drainage within the Klemish, and Klemish & Flores neighborhood is handled with ditching, and is not proposed to be improved as part of this project.

4. CONSIDERED IMPROVEMENTS

4.1 Project Area Selection

The City's 10-year Capital Improvement Program calls for proposed 2020 overlay improvements on several street segments in the Klemish, Klemish & Flores, Sunfish Square, Sunfish Square 2nd, Windemere Woods, and Windemere Woods 2nd residential neighborhoods. In total, approximately 19,612 square yards of pavement was proposed to receive overlay improvements in 2020. The scope of these proposed improvements is included in *Appendix A* of this report.

4.2 Pavement Condition Evaluations/Ratings

City Staff generally evaluates and rates the pavement conditions of all city streets on an annual basis using the Pavement Surface Evaluation and Rating (PASER) system. This system requires a visual evaluation of each pavement surface, which is reflected by a 0 to 10 scale, with 10 being a new street. The PASER Ratings of the streets proposed for 2020 overlays fell significantly from 2017 when they were originally placed in the CIP to 2019. Ratings were generally 5 for Klemish/Klemish & Flores, 7 for Sunfish Square/Sunfish Square 2nd, and 8 for Windemere Woods/Windemere Woods 2nd in 2017. By 2019 these ratings fell to a range of 3 to 7, with rating point drops by as many as 5 on some street segments. A PASER rating summary of the proposed street segments is included in *Appendix B* of this report.

4.3 Bituminous Overlay Review

Staff reviewed this project from the traditional overlay procedure. The rural sections in the Klemish, and Klemish & Flores neighborhood, has previously received an overlay. Staff proposed to complete a 6 to 7-foot edge mill of the pavement, down to 2-inches along the outside edge of the pavement, followed by a 2-inch bituminous overlay. This allows the edge of the pavement to match existing driveways, and builds up the crown of the road. The urban sections in the Sunfish Square, and Windemere Woods neighborhoods proposed to receive a 2-inch mill, followed by a 2-inch bituminous overlay. While reviewing the proposed streets, Staff discovered the pavement has deteriorated in several areas, beyond the point where a bituminous overlay is feasible.

Staff felt this was not a cost-effective solution, given the poor condition of the streets, which in general are distressed beyond a typical bituminous overlay treatment.

4.4 3.5" Full-Depth Mill and Overlay

Staff has spoken with consultants and contractors to help determine possible routes for dealing with variable depth bituminous section. One option would be to complete a 3.5" full-depth mill and overlay. This process would include removing all existing bituminous pavement, and where the pavement is less than 3.5" thick, remove class 5 as necessary, and pavement with our current standard of 3.5". In general this would leave the street with less class 5 than is standard today, but we would be able to do a standard 2" mill & overlay treatment in the future, and we would expect to have an anticipated life of 20 to 40 years. The advantage to removing the bituminous pavement versus milling, is it gives the contractor flexibility in the process. They may choose to mill what they can and get credit for the millings at the plant, however, this market can go up and down, and currently our understanding is millings credits are not high currently. In general, the streets are still at the stage where with maintenance, Staff feels they can be useful for 5 to 10 years to come, and the City's limited funds can be spent on streets which are better candidates for overlays, or are ready for reconstruction.

An engineer's estimate was completed for the proposed project areas, with the exception of all of Klemish outside of Sodium Street. To complete the 3.5" full-depth mill and overlay as described above, the project costs are estimated to be \$834,850.50.

Staff felt this was not a cost-effective solution, and given the limited funding available there are other City streets which are at the proper condition for overlay treatments.

4.5 Full-Depth Reclamation

In the recent past, including the 2017 and 2018 reconstruction programs, streets with similar conditions received full-depth reclamation treatments. This included grinding up the existing bituminous pavement and underlying aggregate base, after which 3.5-inches of the reclaimed material is removed with the remaining used as new aggregate base. Then 3.5-inches of new bituminous pavement is placed on top. In general, the streets are still at the stage where with

maintenance, Staff feels they can be useful for 5 to 10 years to come, and the City's limited funds can be spent on streets which are better candidates for overlays, or are ready for reconstruction.

An engineer's estimate was completed for the proposed project areas, with the exception of all of Klemish outside of Sodium Street. To complete the full-depth reclamation as described above, the project costs are estimated to be \$811,221.59.

Staff felt this was not a cost-effective solution, and given the limited funding available there are other City streets which are at the proper condition for overlay treatments.

5. CONCLUSIONS AND RECOMMENDATIONS

This feasibility report explores proposed bituminous pavement overlay improvements to approximately 19,612 square yards of public streets in 2020. The street segments were proposed to receive 2-inch bituminous overlays, in conjunction with milling and full-depth patching as needed. When this was found to not be feasible, Staff explored a 3.5" full-depth mill and overlay, FDR options were also looked at for the proposed street segments as a possible alternative to the poor conditions found during Staff review of the streets.

It is the recommendation of City Staff that the 2020 mill and overlay improvements as proposed in the current CIP not be completed under City Improvement Project No. 20-02 since these improvements are not generally feasible or cost-effective from an engineering standpoint.

Staff reviewed the current CIP and identified other street segments as the best candidates for 2020 mill and overlay improvements based on available funding sources. At the February 18, 2020 Public Works Committee meeting Staff brought forward a case to consider the streets within Business Park 95, which are currently proposed for mill and overlay improvements in 2024 per the 2020 – 2029 CIP, but are exhibiting severe pavement stripping, and would require extensive patching in the years to come, possibly deteriorating the pavement beyond the scope of a mill and overlay if left alone. Additionally Staff has identified Regency Pond 1st, 2nd, and 3rd Additions which are currently proposed for mill and overlay improvements in 2022 per the 2020 – 2029 CIP. The Public Works Committee motioned to recommend City Council acceptance of the Feasibility Report for the 2020 Pavement Overlay Improvements, Improvement Project No. 20-02, and to recommend that a new Feasibility Report be ordered including the streets in Business Park 95 and Regency Ponds 1st, 2nd and 3rd Additions.

APPENDIX A

Project Scope – Klemish, Klemish & Flores

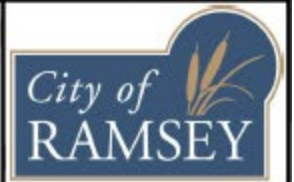
Project Scope – Sunfish Square, Sunfish Square 2nd

Project Scope – Windemere Woods, Windemere Woods 2nd



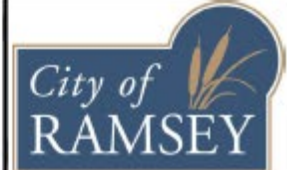
STATE HIGHWAY No. 47

KLEMISH / KLEMISH & FLORES PROJECT SCOPE



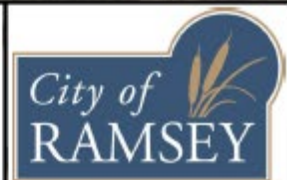


**SUNFISH SQUARE 1ST & 2ND
PROJECT SCOPE**





**WINDEMERE WOODS 1ST & 2ND
PROJECT SCOPE**



APPENDIX B

Street Segment History

APPENDIX C

Engineer's Estimate

20-02 2020 Street Overlay Improvements						
Engineer's Estimate - Assuming full-depth mill & overlay (3.5")						
All Areas						
ITEM No.	MNDOT No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	COST EXTENSION
1	2021.501	MOBILIZATION (5%)	LS	1	\$ 31,200.00	\$ 31,200.00
2	2112.519	SUBGRADE CORRECTIONS	SY	2,470	\$ 25.00	\$ 61,750.00
3	2104.505	REMOVE BITUMINOUS PAVEMENT	SY	25,130	\$ 3.00	\$ 75,390.00
4	2357.502	BITUMINOUS MATERIAL FOR TACK COAT	GAL	1,760	\$ 3.00	\$ 5,280.00
5	2360.501	TYPE SP 9.5 WEARING COURSE MIXTURE (SPWEA340C) (1.5")	TON	2,080	\$ 90.00	\$ 187,200.00
6	2360.502	TYPE SP 12.5 NON-WEARING COURSE MIXTURE (SPNWB330C) (2.0")	TON	2,770	\$ 85.00	\$ 235,450.00
7	2506.602	RESET CATCH BASIN / MANHOLE CASTING	EA	14	\$ 1,000.00	\$ 14,000.00
8	2531.501	REMOVE & REPLACE CONCRETE CURB & GUTTER DESIGN SURMOUNTABLE	LF	840	\$ 50.00	\$ 42,000.00
9	2531.604	REMOVE & REPLACE 7" CONCRETE VALLEY GUTTER	SY	131	\$ 80.00	\$ 10,480.00
10	2563.601	TRAFFIC CONTROL	LS	1	\$ 3,000.00	\$ 3,000.00
<i>Non-Assessable Construction Cost</i>						\$ 61,750.00
<i>Street Constructicon Cost</i>						\$ 590,000.00
<i>Storm Sewer Construction Cost</i>						\$ 14,000.00
<i>2020 Overlay Program Construction Cost</i>						\$ 665,750.00
<i>10% Contingency Cost</i>						\$ 66,575.00
2020 Overlay Program Project Cost (14% Indirect Cost)						\$ 834,850.50

20-02 2020 Street Overlay Improvements						
Engineer's Estimate - Assuming Full Depth Reclamation (FDR)						
All Areas						
ITEM No.	MNDOT No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	COST EXTENSION
1	2021.501	MOBILIZATION (5%)	LS	1	\$ 25,000.00	\$ 25,000.00
2	2215.501	BITUMINOUS PAVEMENT RECLAMATION (FULL DEPTH)	SY	25,130	\$ 1.25	\$ 31,412.50
3	2331.607	HAUL AND DISPOSE BIT PAVEMENT RECLAMATION (LV)	CY	3,050	\$ 15.00	\$ 45,750.00
4	2357.502	BITUMINOUS MATERIAL FOR TACK COAT	GAL	1,760	\$ 3.00	\$ 5,280.00
5	2360.502	TYPE SP 12.5 NON-WEARING COURSE MIXTURE (SPNWB330C) (2.0")	TON	2,770	\$ 85.00	\$ 235,450.00
6	2360.501	TYPE SP 9.5 WEARING COURSE MIXTURE (SPWEA340C) (1.5")	TON	2,080	\$ 90.00	\$ 187,200.00
7	2506.602	RESET CATCH BASIN / MANHOLE CASTING	EA	14	\$ 1,000.00	\$ 14,000.00
8	2531.501	REMOVE & REPLACE CONCRETE CURB & GUTTER DESIGN SURMOUNTABLE	LF	840	\$ 50.00	\$ 42,000.00
9	2531.604	REMOVE & REPLACE 7" CONCRETE VALLEY GUTTER	SY	131	\$ 80.00	\$ 10,480.00
10	2563.601	TRAFFIC CONTROL	LS	1	\$ 3,000.00	\$ 3,000.00
<i>Street Constructicon Cost</i>						\$ 585,572.50
<i>Storm Sewer Construction Cost</i>						\$ 14,000.00
<i>2020 Overlay Program Construction Cost</i>						\$ 599,572.50
<i>10% Contingency Cost</i>						\$ 59,957.25
2020 Overlay Program Project Cost (23% Indirect Cost)						\$ 811,221.59

APPENDIX D

WSB Pavement Forensics Report

Memorandum

To: Joe Feriancek, PE

From: Andrea Blanchette, PE
Tom Wood
Sheue Torng Lee

Date: January 10, 2020

Re: Pavement Coring Forensic Report
City of Ramsey
WSB Project No. 015367-000

Introduction

WSB is pleased to submit this pavement forensics report detailing the results of the pavement coring which was completed on January 9, 2020 in the City of Ramsey. The various characteristics of the pavement cores were summarized to provide information to the City to assist in determining the appropriate pavement maintenance or rehabilitation method for the roadways.

A total of 13 pavement cores were obtained in the Sunfish Square/Windemere Woods neighborhood and the Klemish & Flores neighborhood. The locations of the pavement cores are summarized in **Figure 1** and **Figure 2**. A summary of the pavement depths and conditions for the streets are shown in **Table 1**. Pictures of the cores obtained can be found in the **Appendix**.

RAMSEY 2020 Overlay Improvements Sunfish Square / Windemere Woods

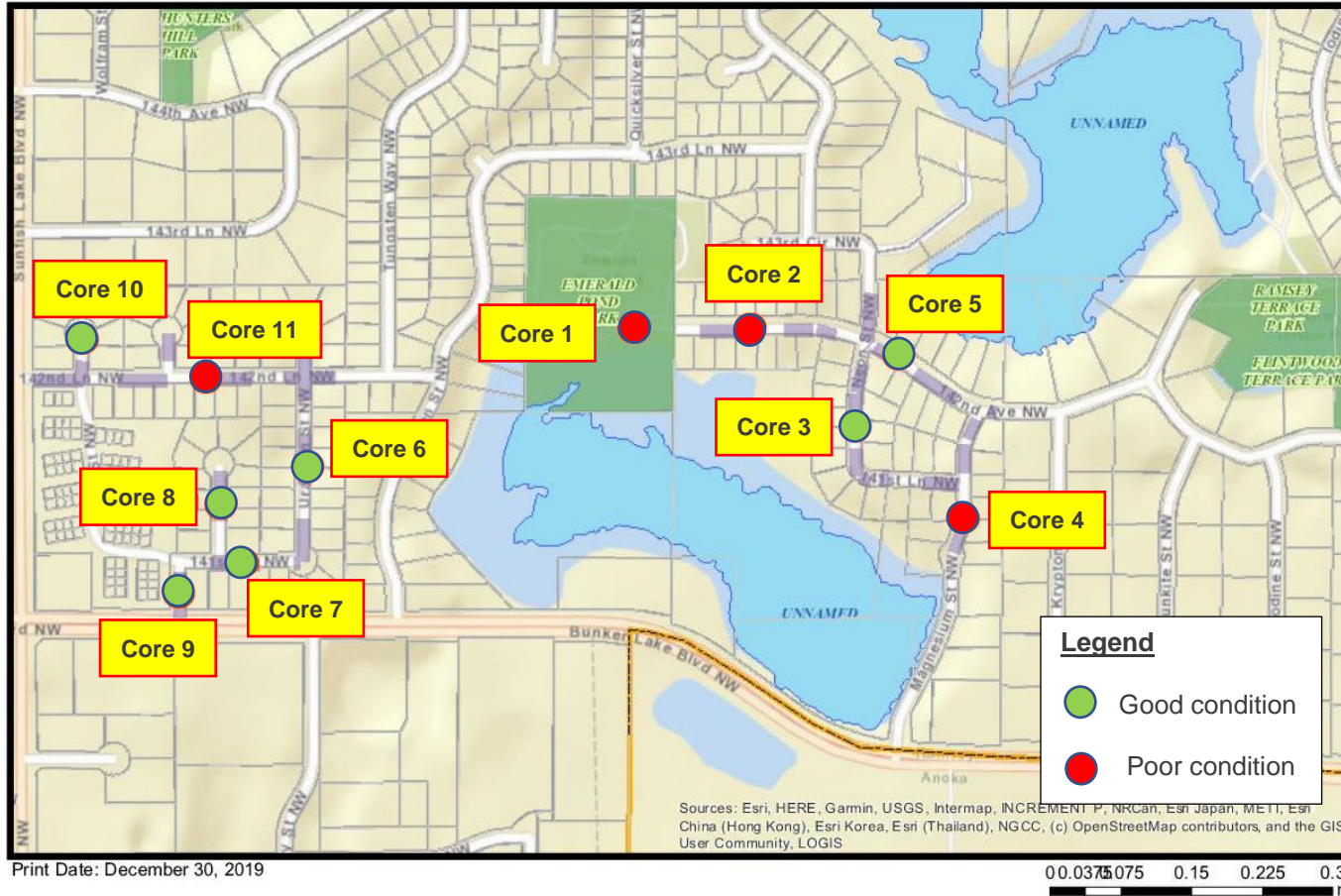


Figure 1. Pavement core locations in Sunfish Square/Windemere Woods neighborhood.

RAMSEY 2020 Overlay Improvements

Klemish & Flores

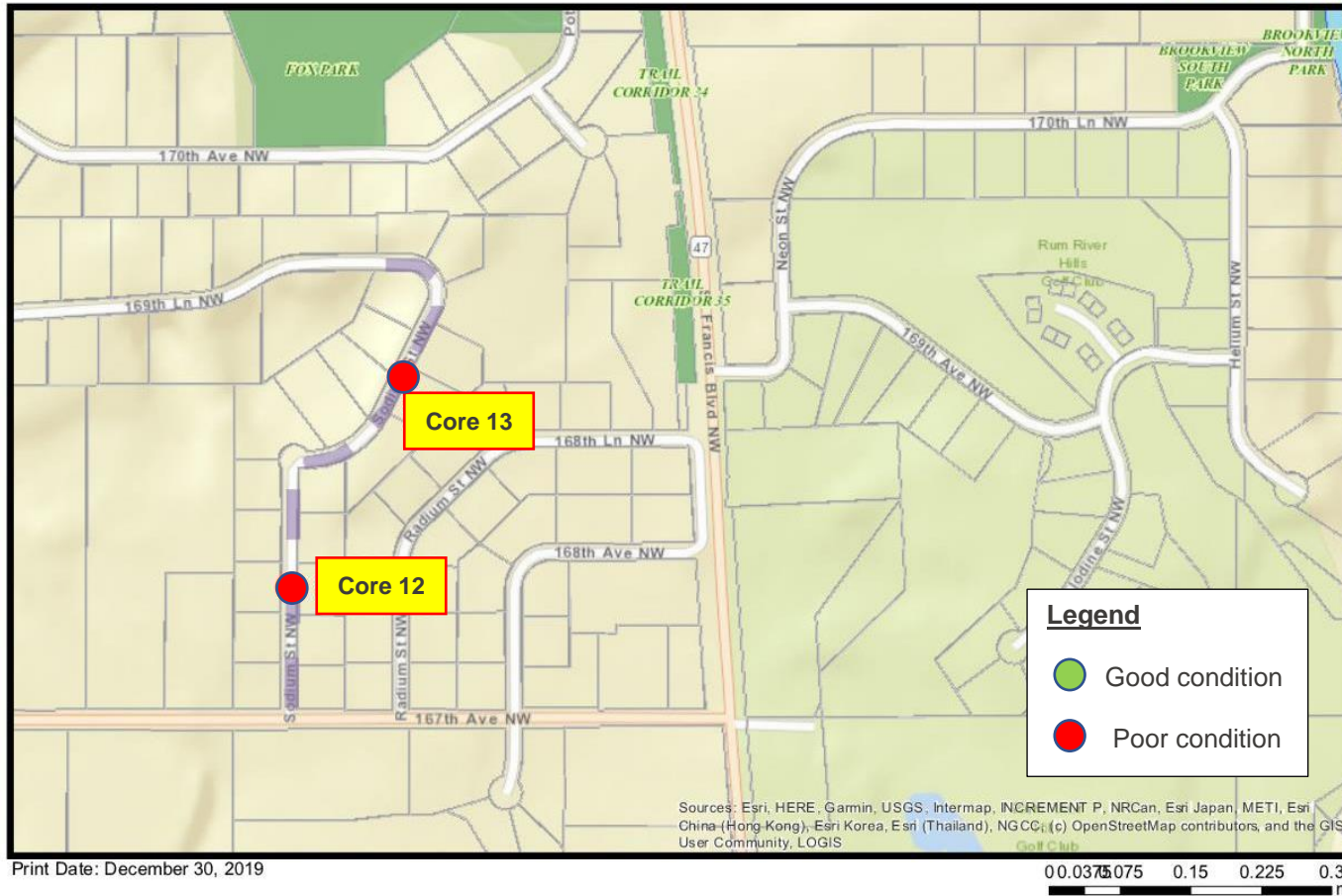
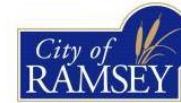


Figure 2. Pavement core locations in Klemish & Flores neighborhood.

Table 1. Pavement core location and information.

Core ID	Location	Bituminous Depth (inches)	Aggregate Depth ¹ (inches)	Notes
1	Emerald Pond Park	3.25	4	Top lift was 2 inches. Core was in poor condition showing deterioration, losing fines and binder.
2	142 nd Avenue NW	3.25	4	Top lift was 2 inches. Core was in very poor condition and it had severely deteriorated.
3	Neon Street NW	3.25	4.5	Top lift was 1.5 inches. Core was in good condition.
4	Magnesium Street NW	3.25	4	Top lift was 1.5 inches. Core was in poor condition showing deterioration, losing fines and binder.
5	142 nd Avenue NW	2	4	Core was in good condition.
6	Uranium Street NW	2.75	3.5	Top lift was 1.75 inches. Core was in good condition.
7	141 st Lane NW	3	3.5	Top lift was 2 inches. Core was in good condition.
8	Vanadium Street NW	2.5	4	Top lift was 1.5 inches. Core was in good condition.
9	Wolfram Street NW	2.5	4	Top lift was 1.5 inches. Core was in moderately good condition, started to exhibit signs of deterioration.
10	Xenon Street NW	2	4	Core was in good condition.
11	142 nd Lane NW	2.5	4.5	Top lift was 1.5 inches. Core was in poor condition showing deterioration, losing fines and binder.
12	Sodium Street NW	2.75	2.5	Top lift was 1.5 inches. Core was in very poor condition and it had severely deteriorated.
13		3	2.5	Top lift was 1.5 inches. Core was in poor condition showing deterioration, losing fines and binder.
¹ Subgrade material was observed to be select granular material on all core locations.				

Summary of Findings

One core obtained at the parking lot in Emerald Pond Park had a bituminous thickness of 3.25 inches. There was 4 inches of aggregate base and the core was in poor condition exhibiting deterioration.

A total of 10 cores were obtained along the residential streets in Sunfish Square/Windemere Woods neighborhood as shown in Figure 1. The bituminous depths were ranging from 2 inches to 3.25 inches, with at least 3.5 inches of underlying aggregate base. Half of the cores obtained along the streets east of Emerald Pond Park were in good condition, while the other half were deteriorated. Most of the cores obtained along the streets west of Emerald Pond Park were in good condition, except for the core obtained along 142nd Lane NW (Core 11) had deterioration, losing fines and binder.

Two cores obtained along Sodium Street NW had bituminous depths of 2.75 inches and 3 inches, with 2.5 inches of aggregate underneath. Both cores were in poor condition, which showed degradation and deterioration.

Appendix

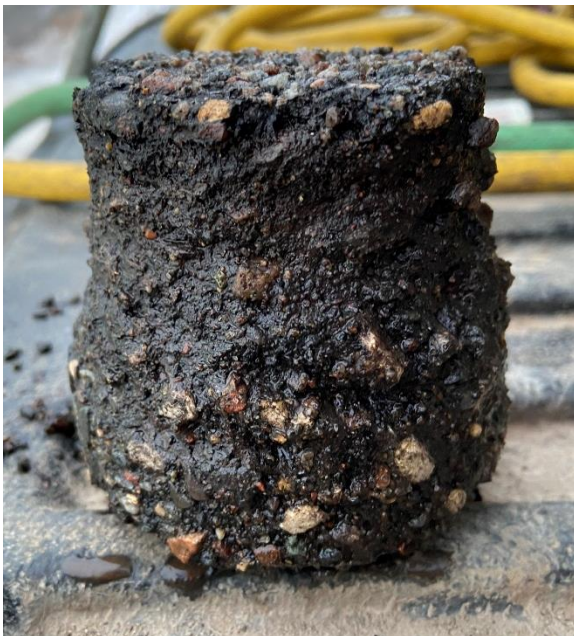
City of Ramsey

Coring Pictures

Core 1 (Emerald Pond Park)



Core 2 (5951 142nd Avenue NW)



Core 3 (14177 Neon Street NW)



Core 4 (14150 Magnesium Street NW)



Core 5 (5859 142nd Ave NW)



Core 6 (14211 Uranium Street NW)



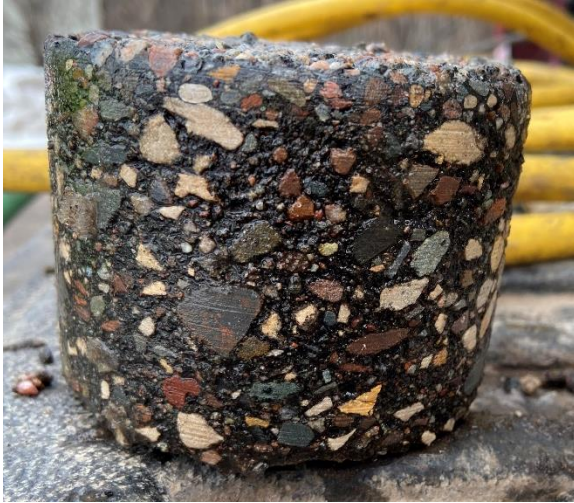
Core 7 (6260 141st Lane NW)



Core 8 (14191 Vanadium Street NW)



Core 9 (Wolfram Street NW)



Core 10 (14260 Xenon Street NW)



Core 11 (6280 142nd Lane NW)



Core 12 (16742 Sodium Street NW)



Core 13 (16863 Sodium Street NW)

