

DRAFT REPORT

Street Study

Silver Creek Township
Wright County, Minnesota

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Introduction

The roadway network owned and operated by Silver Creek Township is the largest asset owned by the Township. Proper maintenance and rehabilitation of the roadway network is crucial in maintaining access to properties and maintaining the Township's infrastructure.

Increased demand for residential housing and hard surfaces in the area resulted in a majority of the Township's (paved) roadway network being constructed within the last 15 to 25 years. As the infrastructure ages, it is becoming evident that a significant investment will be required to repair the roads that are past their useful service life. Additionally, due to the high cost of reconstructing a road, the Township has indicated that an emphasis on maintaining the roads in good or fair condition will be necessary in the near future.

Silver Creek Township authorized the preparation of this Street Study to determine the existing condition of the roadway network and to receive recommendations for maintenance or rehabilitation measures. Utilizing the findings in this report, the Township will prioritize their maintenance and rehabilitation activities, determine the desired level of service to its residents, and analyze the budget implications of implementing the recommended activities. The data gathered by this investigation is the basis of this study.

This report explains in detail the methodology used to analyze the available data and the basis of the recommendations provided within this report.

Existing Pavement Conditions and Recommendations

A visual inspection of the roads was performed in January 2022 and March 2022. The observations from the visual inspection of the streets are discussed below. Based upon the existing pavement condition, a recommendation for maintenance was developed. The author of this report recognizes that Silver Creek Township will not have funding to implement all recommended maintenance or improvement activities listed below. However, since the application of a maintenance activity might be appropriate one year, and that same maintenance activity may not be appropriate several years later, it is necessary to state the year in which any specific activity is recommended. This approach also allows the Township to determine its total backlog of work, which is discussed in greater detail later in this report.

The Township currently has an established crack filling program. It is recommended that the Township continue this practice of filling the cracks on a regular basis. An accurate estimate of the cost of crack filling for each road requires inventorying the cracks, which was beyond the scope of this report. Therefore, costs for crack filling have not been included below, although it is recommended that the Township continue with this Routine Maintenance activity.

134th Street (off Ferman). The road surface is showing significant signs of distress. Specifically, medium to high severity random cracking was observed but were mostly filled with sealant. Otherwise, the roads exhibited normal transverse and longitudinal thermal cracks and had adequate drainage.

It is anticipated that the asphalt pavement will continue to degrade and the structure will lose its strength until such time that complete replacement of the surface is required. The recommended improvement is a full depth reclamation and pave. The estimated cost is \$129,000.

Dempsey Avenue / 134th Street. The road surface is structurally sound but is showing signs of distress. Specifically, medium severity random cracking was observed but were mostly filled with sealant. Otherwise, the roads exhibited normal transverse and longitudinal thermal cracks and had adequate drainage.

The recommended improvement is placement of a 2" overlay to add structural strength and extend the pavement life. The estimated cost for the construction of a 2" overlay is \$265,600.

145th Street / 143rd Street / Cushing Avenue. The road surface is structurally sound but is showing signs of distress. Specifically, medium severity random cracking was observed but were mostly filled with sealant. Otherwise, the roads exhibited normal transverse and longitudinal thermal cracks and had adequate drainage.

The recommended improvement is placement of a 2" overlay to add structural strength and extend the pavement life. The estimated cost for the construction of a 2" overlay is \$172,640.

127th Street (CR 8 to CR 111). The road surface is structurally sound with normal transverse thermal cracks. The thermal cracks in the pavement have been filled with sealant and the road appeared to have adequate drainage and in-slopes.

No improvements are recommended for the 5-year planning term of this report. The Township should continue to crack fill the pavement on a regular schedule.

Emerson Avenue. The road surface is structurally sound with normal transverse thermal cracks. The thermal cracks in the pavement have been filled with sealant and the road appeared to have adequate drainage and in-slopes. There is a dedicated T-turnaround at the end of the road which is sufficient. There is one small area which requires brush removal within the right-of-way.

The recommended improvement is the construction of a 2" overlay, which would add structural strength and extend the service life. The estimated cost of a 2" overlay is \$22,400.

Ferman Avenue. The road surface is structurally sound with normal transverse thermal cracks. The thermal cracks in the pavement have been filled with sealant, however, secondary cracks are forming around the normal cracks. The road appeared to have adequate drainage and in-slopes. There is a segment of surmountable concrete curb and gutter on one side of the road near the top of the hill.

The recommended improvement is the construction of a 2" overlay, which would add structural strength and extend the service life. The estimated cost of a 2" overlay is \$32,480.

116th Street. The road surface is showing signs of distress. Specifically, medium severity random cracking was observed but were mostly filled with sealant. Otherwise, the pavement exhibited normal transverse and longitudinal thermal cracks and had adequate drainage.

It is anticipated that the asphalt pavement will continue to degrade and the structure will lose its strength until such time that complete replacement of the surface is required. The recommended improvement is a full depth reclamation and pave. The estimated cost is \$223,600.

128th Street. The road surface is structurally sound but is showing signs of distress. Specifically, medium severity random cracking was observed but were mostly filled with sealant. Otherwise, the roads exhibited normal transverse and longitudinal thermal cracks and had adequate drainage.

If left unmaintained, the asphalt pavement will continue to degrade and the structure will lose its strength until such time that complete replacement of the surface is required. The recommended improvement is placement of a 2" overlay to add structural strength and extend the pavement life. The estimated cost for the construction of a 2" overlay is \$203,000.

119th Street / Blackwood. The road surface is showing signs of distress. Specifically, medium severity random cracking was observed. Additionally, the roads exhibited normal transverse and longitudinal thermal cracks and had adequate drainage.

If left unmaintained, the asphalt pavement will continue to degrade and the structure will lose its strength until such time that complete replacement of the surface is required. The recommended improvement is placement of a 2" overlay to add structural strength and extend the pavement life. The estimated cost for the construction of a 2" overlay is \$262,450.

Banyon Avenue. The road surface is showing signs of distress. Specifically, medium severity random cracking was observed.

It is anticipated that the asphalt pavement will continue to degrade and the structure will lose its strength until such time that complete replacement of the surface is required. The recommended improvement is a full depth reclamation and pave. The estimated cost is \$55,800.

Baker Avenue. The road surface is showing signs of distress. Specifically, medium severity random cracking was observed.

It is anticipated that the asphalt pavement will continue to degrade and the structure will lose its strength until such time that complete replacement of the surface is required. The recommended improvement is a full depth reclamation and pave. The estimated cost is \$83,700.

120th Street. The road surface is generally structurally sound and exhibits normal transverse and longitudinal thermal cracks in most locations. However, at the curve around the wetland that road exhibits higher severity longitudinal cracking that may be an indicator of slope instability.

No improvements are recommended for 120th Street at this time. The Township should continue to crack fill the pavement on a regular schedule and should monitor the area near the wetland for additional signs of slope instability.

Meridian Avenue (South by lakes). The road surface is in good condition as this road was overlaid in 2021. The Township should continue to crack fill the pavement on a regular schedule.

97th Street. The road surface is in good condition as this road was overlaid in 2021. The Township should continue to crack fill the pavement on a regular schedule.

101st Street. The road surface is in good condition as this road was overlaid in 2021. There are some steeper slopes that are difficult to address because of the proximity to the lake and the placement of the houses. The Township should continue to crack fill the pavement on a regular schedule.

Amery Avenue. The road surface is in good condition as this road was overlaid in 2021. The Township should continue to crack fill the pavement on a regular schedule.

Armitage Avenue. The road surface is structurally sound and is showing normal signs of aging. Specifically, low to medium severity thermal cracking was observed but were mostly filled with sealant. Otherwise, the road has adequate drainage.

If left unmaintained, the asphalt pavement will continue to degrade and the structure will lose its strength until such time that complete replacement of the surface is required. The recommended improvement is placement of a 2" overlay to add structural strength and extend the pavement life. The estimated cost for the construction of a 2" overlay is \$156,800.

140th Street. The road surface is structurally sound and is showing normal signs of aging. Specifically, low to medium severity thermal cracking was observed but were mostly filled with sealant. Otherwise, the road has adequate drainage.

If left unmaintained, the asphalt pavement will continue to degrade and the structure will lose its strength until such time that complete replacement of the surface is required. The recommended improvement is placement of a 2" overlay to add structural strength and extend the pavement life. The estimated cost for the construction of a 2" overlay is \$327,360.

Franklin Avenue. Pattern cracking and edge cracking are prevalent. The pavement is nearing or is past its useful life. The recommended improvement is full depth reclamation and pave. The estimated cost of a full depth reclamation and pave is \$223,600.

150th Street. The pavement on 150th Street is in like new condition. Normal thermal cracking is present. The drainage is adequate and the surface has been chip sealed.

148th Street. The surface on 148th Street (near the truck stop) is exhibiting some medium severity pattern cracking, particularly near the entrances to the truck stop. Township maintenance staff state that this section of pavement utilizes a "Type F" oil in its bituminous mixture. The pavement has been chip sealed twice.

Although no improvements are recommended at this time, this segment will likely require improvements within 5-7 years.

Devitt and 148th Street. The pavement is exhibiting medium severity pattern cracking. The road serves the properties on the west side of Lock Lake and is restrained by the locations of the existing buildings. There are little to no ditches. We recommend that the Township consider a total reconstruct in the future, which would include curb and gutter for drainage. We would also recommend that the Township consider improvements at the intersection with County Road 8 to better delineate the roadway.

As a temporary improvement, the Township may consider constructing a 2" overlay to extend the service life. The estimated cost for a 2" overlay is \$145,800.

140th Street / Duffield Avenue / 144th Street. The road surface is structurally sound and is showing normal signs of aging. Specifically, low to medium severity thermal cracking was observed but were mostly filled with sealant. Otherwise, the road has adequate drainage.

If left unmaintained, the asphalt pavement will continue to degrade and the structure will lose its strength until such time that complete replacement of the surface is required. The recommended improvement is placement of a 2" overlay to add structural strength and extend the pavement life. The estimated cost for the construction of a 2" overlay is \$226,300.

150th Street (Cemetery Road). The road is paved at the start and then transitions to gravel. The pavement surface is 24 feet wide. The pavement is exhibiting medium severity pattern cracking and showing signs of distress. The road lacks a dedicated turnaround at the termini.

We recommend a structural improvement of a 2" overlay for the paved section of road. Additionally, we recommend that the Township construct a dedicated turn around at the termini to allow for safe turn around of vehicles. The estimated cost of 2" overlay is \$28,350. Estimating the cost for easement acquisition for the dedicated turn around is beyond the scope of this report.

Appleton Avenue / Meridian Avenue. The road surface is in good condition and is showing normal signs of aging. The pavement width is 24 feet and the surface has been chip sealed. The road generally has adequate drainage, with the exception of one isolated area across from the gravel pit. There is one area in which the water overtops the road. See "Drainage Study, Appleton Avenue" prepared by Hakanson Anderson, dated March of 2016 for additional information.

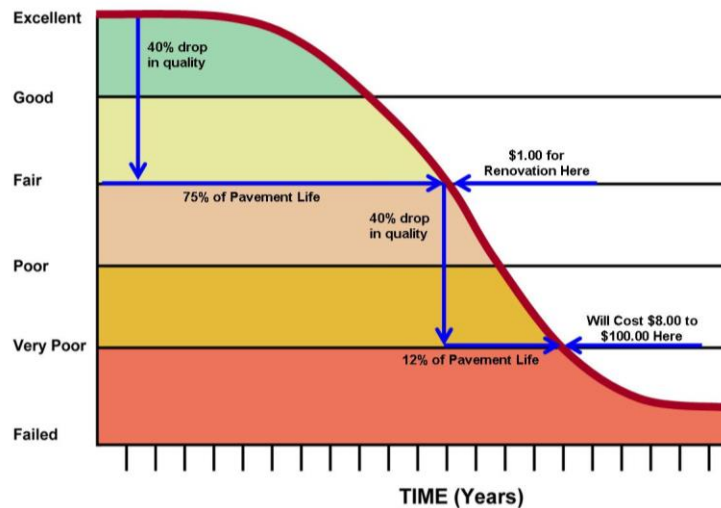
We recommend a structural improvement of a 2" overlay and the estimated cost of the improvements is \$220,800.

The Pavement Deterioration Curve

In order to make educated decisions on maintaining the Township's (paved) roadway infrastructure, the Township must first understand the characteristics of pavement deterioration. Pavement generally deteriorates according to a certain pattern. Figure 1 on the next page is a model of the pattern. The vertical axis of the graph indicates the condition of the pavement, from failed to excellent. The horizontal axis indicates the passage of time in years. The pavement begins in excellent or new condition and remains in excellent condition for a few years. Over time, cracks develop and the effects of weathering and traffic loads cause the condition of the pavement to worsen. The rate at which the pavement deteriorates will increase dramatically as the pavement passes through the midpoint of its life. As can be seen in the figure, the first 40% drop in quality will occur over approximately 75% of the pavements life, while the second 40% drop in quality will occur over approximately 12% of the pavements life.

Furthermore, Figure 1 illustrates the benefits of performing maintenance before the pavement reaches a poor condition. A preventative maintenance repair that may be applicable to a pavement in fair condition will not be appropriate for that same pavement in a few years when the condition worsens. If the agency waits until the pavement reaches a failed state, the costs of the required repair can be eight to ten times the cost of the preventative maintenance repair that could have been applied several years earlier.

Figure 1
Typical Pavement Deterioration Curve



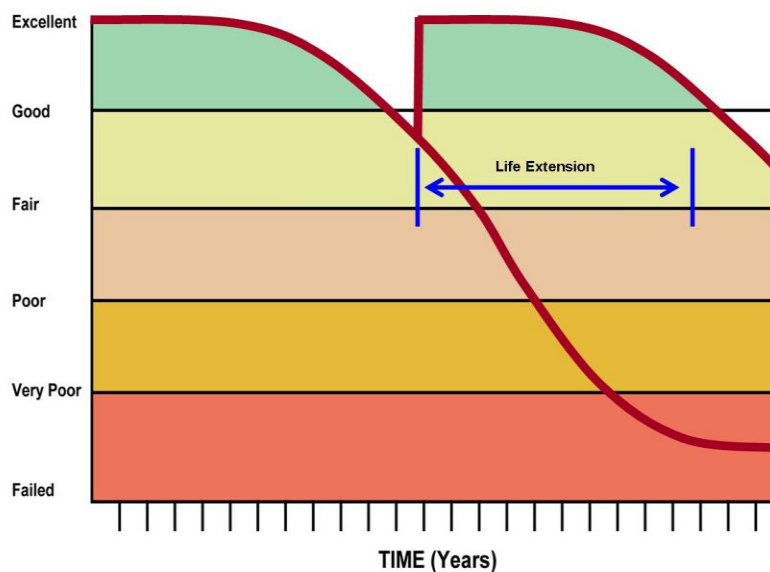
Theory of Pavement Management

Pavement management is defined as the practice of planning for pavement repairs and maintenance with the goal of extending the service life of the pavement and maximizing the value by obtaining the lowest life cycle costs. Simply put, pavement management is the selection of the right repair on the right road at the right time.

Pavement management involves the use of several different repair techniques and the knowledge of how and when to use these repair techniques. Aside from realistic funding levels, effective pavement management requires in-depth knowledge of local roads, a systematic means of cataloguing data, and a systematic means of selecting repairs.

Figure 2 on the next page illustrates the life extending benefits of preventative maintenance. As can be seen from the figure, applying preventative maintenance at the proper time interrupts the typical deterioration curve of a pavement. The pavement condition line extends upwards at the point of the treatment, indicating that the preventative maintenance has restored the pavements condition to “good”. The deterioration then continues at a slightly flatter slope until the pavement reaches a failed state, or until another properly selected repair technique is made. The life extension can be measured on the horizontal axis and represents the extended service life gained by the application of the preventative maintenance technique.

Figure 2
Life-Extending Benefit of Preventive Maintenance Treatment



This pavement management concept, as simple as it seems, has not been fully accepted by the transportation community. The traditional approach to maintenance has been to react to problems after they occur, rather than to prevent them from occurring. This reactive approach to maintenance may not only be more costly and time consuming than a preventive one, but could also jeopardize the structural capacity of the pavement.

The recommendations presented within this report have been formulated to recognize the lowest life cycle costs for the roadway network owned by Silver Creek Township. Descriptions of the pavement maintenance and rehabilitation techniques that may be utilized to realize the lowest life cycle cost are presented below.

Pavement Maintenance and Rehabilitation

In general, maintenance and rehabilitation work can be set into four broad categories:

- A. Routine Maintenance
 - Crack-filling. This should be performed on roadways to protect the pavement from further deterioration.
 - Localized patching. Required for isolated areas of failure.
 - Shouldering. Adding gravel to the shoulder of the roadway in areas where the shoulder has deteriorated over time due to weather or traffic.
- B. Preventative Maintenance
 - Seal-coating. A surface treatment to rejuvenate the pavement, provide a safer driving surface, and provide temporary aesthetic value.
- C. Structural Improvements
 - Overlays. Provides additional strength to a roadway. Can substantially increase the service life of a pavement if performed at the opportune time.
- D. Reconstruction of Surface
 - Full Depth Reclamation (FDR) and Overlay. Reclaiming of the existing bituminous and base material. Required when severe deterioration of the pavement has occurred, however, the subgrade integrity remains intact.
- E. Total Reconstruction
 - Rebuilding the subgrade, reclaiming or construction of new base, drainage improvements, and a new asphalt surface. Often required when the pavement has severely deteriorated and/or there are drainage problems.

Maintenance is required on a scheduled basis for any paved roadway. **Crack filling** can significantly add to the life of a pavement. Sealing the cracks prevents water from entering into the opening. During spring and fall freeze/thaw cycles, water that is allowed to enter the cracks will freeze and cause the cracks to widen. Eventually, water could enter the subgrade through the cracks. Water in the subgrade can cause more severe structural damage to the roadways. If not maintained, these cracks can lead to further deterioration of the roadway, and ultimately to structural failure. The recommended method of crack filling consists of routing the crack to a depth and width of three quarters of an inch to

create a reservoir into which crack sealing material can be placed. Then, the crack is blown clean using compressed air and a heat lance is used to heat the bituminous edges for a superior bond. A hot rubberized crack seal material is then added to the crack. The material bonds to the sides of the crack and has enough expansive ability to allow for slight movement of the pavement without allowing water to get into the crack. A crack sealing project without a reservoir will generally not seal the crack from water intrusion.

Seal coating is utilized to rejuvenate the surface of the pavement and add surface texture for safety of motorists. During the warm, dry summer months, the oil (bitumen) in the asphalt will evaporate, resulting in raveling of the pavement surface. As raveling occurs, the pavement loses aggregate and structural strength. A seal coat adds a layer of bitumen and a layer of aggregate to the surface of the pavement. Ideally, seal-coats should be applied before raveling starts to occur.

Localized patching is work to repair areas of a roadway where the existing pavement has failed structurally. Patching is effective if the majority of the roadway is sound. Areas of failed pavement must be removed, the aggregate base improved, and the new asphalt surface is constructed. For the best results, the bituminous edges of the patch should be sawcut to provide a vertical bonding surface. Repairing localized areas of failure extends the functional roadway stability.

Of all the types of roadway rehabilitation, **overlays** are the most difficult to judge when to use. Overlays are considerably more expensive than crack filling and seal coating. Subsequently, the tendency is to delay overlay projects as long as possible. If delayed too long, complete structural failure can occur, leading to more costly restoration requirements. Once alligator or block cracking has become prevalent, reconstruction becomes the only cost-effective treatment method available. The ideal time to overlay a roadway is after it is showing some distress, but before the distress is severe. Prior to overlaying a roadway, potholes and areas of severe alligator or block cracking must be repaired by patching. A 2-inch layer of asphalt (overlay) adds structural strength to the roadway and can significantly extend its service life.

Eventually the pavement will fail which then leaves two primary options. The options include reclaim and pave and total reconstruction. **Full Depth Reclamation (FDR) and Pave** involves reclaiming the failed bituminous and gravel base, and construction of a new asphalt surface. A reclaim and pave is more costly than an overlay but less than a total reconstruction.

In the case where the pavement has failed along with the road subgrade, a **Total Reconstruction** will be required. Total reconstruction involves removing or reclaiming the failed bituminous and gravel base, rebuilding the subgrade, construction of a new aggregate base, and construction of a new asphalt surface. Often times the drainage is improved and culverts are replaced with a total reconstruction. A total reconstruction is the most costly restoration activity and has the longest timeframe for completion.

In Table 1 below, several of the repair techniques are categorized into treatment bands. The application of the repair techniques at the right time will greatly extend the pavement life.

Table 1 – Treatment Band Descriptions

Treatment Band	Description
Do Nothing	Pavement is in new or excellent condition – pavement is in need of no maintenance
Routine Maintenance	Pavement is in good condition – pavement may be in need of crack filling, shouldering, or minor localized repairs
Preventative Maintenance	Pavement is in fair condition – pavement surface may be in need of a seal coat or thin non-structural overlay
Structural Improvements	Pavement is in poor condition – pavement structure is in need of additional structural strength and could require moderate patching
Reconstruction of Surface	Pavement is in poor to very poor condition – repair typically includes reclamation of the existing surface and base material with the construction of a new bituminous surface
Total Reconstruction	Pavement has failed – the existing bituminous surface and base must be removed, the subgrade must be repaired, and a new base and bituminous surface must be constructed

Estimated Costs of Maintenance Activities

For purposes of this report, a typical or average cost for each of the maintenance or rehabilitation practices was determined. It should be noted that costs, particularly for reconstructions, can vary greatly depending upon subgrade soils, extent of drainage improvements, and density of housing or obstructions. Prior to considering any structural improvement, the Township should order a feasibility report for the specific project to study the potential costs based on actual site conditions. Furthermore, the estimated costs shown in Table 2 on the next page are based upon the assumption that a moderate amount of work will be performed. Therefore, the costs included herein may not be applicable if the work is performed on a much smaller scale.

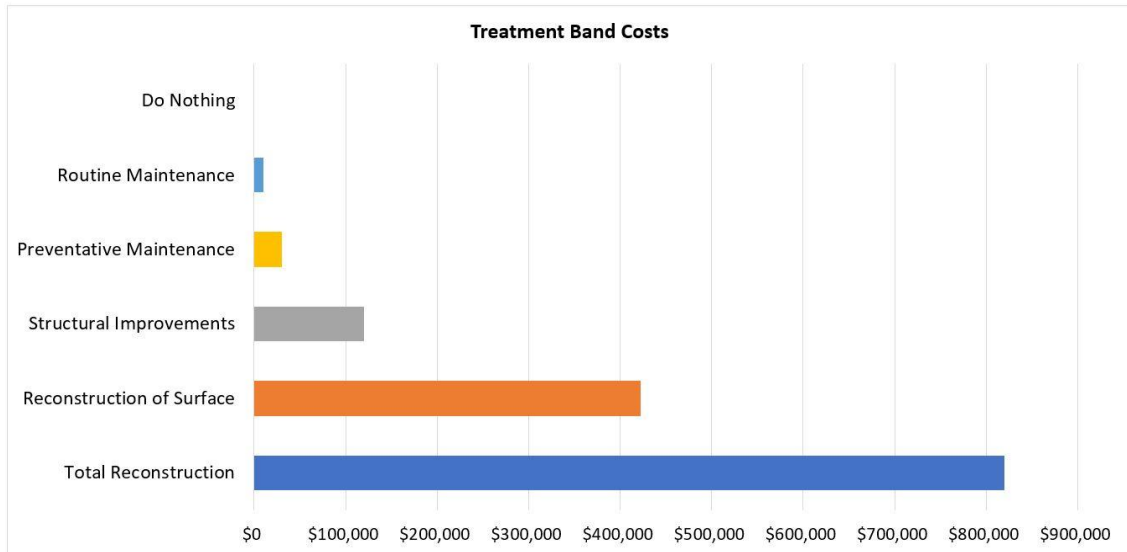
- A. Crack Filling – Crack filling is generally paid for by the pound of crack fill material. Each pound of material will fill approximately three feet of routed crack. The cost of crack filling in 2022 is estimated to be \$0.70 per LF.
- B. Patching – Patching is generally paid for by the area of the patch and includes the cost to remove and replace the pavement, sawcut the edges, and repair the aggregate base. The estimated cost for patching in 2022 is \$40.00 per square yard.
- C. Seal Coating – Seal coating is generally paid for by the gallon for the bituminous material, and by the ton for the aggregate material. The estimated cost to seal coat a 24' wide road in 2022 is \$32,000.00 per mile of roadway.
- D. Overlays – Overlays typically involve some localized patching, a bituminous overlay, driveway matching and shouldering. The estimated cost for a 2-inch overlay in 2022 is \$135,000.00 per mile of roadway.
- E. Full Depth Reclamation (FDR) and Pave – Reclaiming consists of pulverizing and mixing the existing bituminous and class 5 aggregate base to create a base material. After the reclaimed base is tolerated and compacted, two layers of bituminous are constructed. The estimated cost for reclaiming and constructing a 3.5-inch-thick bituminous mat in 2022 is \$420,000 per mile of 24' roadway.
- F. Total Reconstructions – Reconstruction involves removing the existing bituminous, removing the existing aggregate base, rebuilding the subgrade, placing new aggregate base and pavement, and drainage improvements. The estimated cost in 2022 for reconstructing a road is \$825,000.00 per mile of roadway.

Table 2 – Treatment Band Costs

Treatment Band	Estimated Cost per Mile
Do Nothing	\$0
Routine Maintenance	\$500 (Crack Filling)
Preventative Maintenance	\$32,000 (Seal Coating)
Structural Improvements	\$135,000 (Bituminous Overlay)
Reconstruction of Surface	\$420,000 (Reclamation and Overlay)
Total Reconstruction	\$825,000

Figure 3, as shown below, illustrates the costs of the different repair techniques.

Figure 3



As can be seen in the figure above, it has become evident that rehabilitating pavements when they are near failure is not a cost-effective pavement management technique. The concept of “preventive maintenance,” which refers to the application of one or more treatments to a pavement to retard or delay the deterioration, provides for a more cost-effective method of maintaining the Township’s street network.

Although preventative maintenance is overall more cost-effective, project funding continues to be an obstacle for implementing an aggressive preventative maintenance program. Most maintenance techniques, such as crack filling, patching, seal coating, and sometimes bituminous overlays are funded 100% by the general taxpayer levy. Obtaining local funds for maintenance activities and improvements would likely require an increase in the levy.

Backlog of Work – Paved Roads

A recommendation for every pavement segment in the Township has been prepared. Collectively, these repair recommendations constitute a snapshot in time of the condition of the pavement network and an estimated cost of what the recommended work would cost today. This list of recommended repairs and associated estimated costs represents the Township’s backlog of work.

The backlog of work is representative of the repairs that the Township would complete if they had an unlimited budget. The total “backlog of work” can be a useful gauge in determining the Township’s effectiveness of their repair strategy and funding levels. A backlog of work that goes down over time represents that the condition of the roads are improving and the funding levels are likely adequate.

Table 3 – Backlog of Work for Bituminous Paved Roads (by Category)

Description	Estimated Cost
Bituminous Overlays	\$2,553,580
Reclaim and Pave	\$ 715,700
Total	\$3,269,280

Life Cycle Cost Analysis of Paved Roads

The table above represents the total backlog work for a given snapshot in time. However, an effective pavement management program utilizes a planned series of events over the pavement’s life to realize the lowest life cycle costs. Typical maintenance activities, such as crack filling, shouldering, seal coating, patching, and overlay’s can be programmed according to a Township’s adopted maintenance and improvement program. The anticipated maintenance activities over a roadway’s life can then be normalized over the number of years that the pavement is in service to determine an average cost per year. Studies by pavement management experts have determined that it is more cost effective to perform scheduled series of events over a pavements life than it is to just pave and re-construct every 20 years.

Existing Condition of Gravel Roads

The observations from the visual inspection of the gravel roads are presented below. The Township currently has an established graveling program. The purpose of the visual inspection of the gravel roads was to identify areas with deficient drainage, identify obvious obstructions in the clear zone, and other physical constraints.

137th Street. The road utilizes a gravel surface and varies in width from 20 feet to 22 feet. The road appears to have adequate drainage, however, some of the in-slopes appear steeper than 3:1 and are recommended to be corrected. The in-slopes are particularly steep at an inside curve and a wetland crossing. The estimated cost to correct the in-slopes is \$25,000.

Crofoot Avenue (Dead End off 137th). The road utilizes a gravel surface and is only 15 feet wide. The minimum recommended road width for two-way vehicle traffic is 18 feet per AASHTO. The road is a dead end and lacks a sufficient turn around for Township maintenance vehicles, emergency vehicles, and trucks with trailers.

This road only appears to provide access to one residence and provides little public benefit. Therefore, the Township may want to consider vacating the road and allowing the remainder as a private driveway. Vacating the road will reduce the Township's annual maintenance expenses.

Crofoot Street (South of 137th Street). The road utilizes a gravel surface and is approximately 21 feet in width. The road appears to have adequate drainage, however, some of the in-slopes appear steeper than 3:1 and are recommended to be corrected. Additionally, the Township staff indicate that there is a soft spot near the top of the hill. The estimated cost to correct the in-slopes is \$45,000.

114th Street. The road utilizes a gravel surface and is approximately 15 feet in width. There is a parking lot with no definition or separation from the Township road. The ditches are shallow or non-existent and there is brush in the right-of-way. The adjacent houses are relatively close to the road in this area in comparison to the other areas of the Township.

At this time, we recommend that the Township continue to add gravel in accordance with their maintenance schedule. However, at such future date a complete reconstruction of this road will be required.

Ellingwood Avenue. The road utilizes a gravel surface and is approximately 15 feet in width. The ditches are shallow or non-existing. The adjacent houses are relatively close to the road in this area in comparison to the other areas of the Township.

At this time, we recommend that the Township continue to add gravel in accordance with their maintenance schedule. However, at such future date a complete reconstruction of this road will be required.

Ferman Avenue (North of 116) and 120th Street. The roads utilize a gravel surface and are generally in adequate condition. There are areas with steeper in-slopes, approximately 3:1. In one area, there is an approximately 400 feet long stretch with a broken slope. The slope is approximately a 4:1 for the first 12 feet, and then is approximately a 1:1. The Township may consider adding a guardrail in this area to improve the safety of the roadway to the traveling public. On the west end of 120th Street, there is a big hill that obstructs the sight distance just before County Road 7. The roads vary in width from 22 feet to 24 feet.

We recommend that the hill is cut down approximately 6 feet to improve the sight distance and the safety of the roadway. The estimated cost for the improvements is \$85,000.

Gowan Avenue (Border Road). Gowan Avenue is a border road and utilizes a gravel surface. The in-slopes are steeper than desirable for approximately 15 feet and the road surface is approximately 15 feet higher than the toe of the slope. The road is rolling with the existing topography.

We would recommend that the road is re-built to correct the slopes and improve sight distance. The estimated cost of the improvements is \$300,000.

123rd Street (Campground Road). The road utilizes a gravel surface and varies in width from 14 feet to 17 feet. AASHTO recommends a minimum width of 18 feet for two-way traffic. The ditches are deficient or non-existent. There are several trees (100+) that are close to the road edge and are within the clear zone.

We recommend that the Township remove the trees that are obstructions and excavate ditches to improve the drainage. Additionally, we recommend that the road surface is widened to a minimum width of 18 feet to meet AASHTO recommendations for two-way traffic, however, it may be beneficial to improve the road to the Township standard of 24 feet wide. The estimated cost of the improvements is \$150,000.

130th Street. 130th Street utilizes a gravel surface. Isolated areas with steeper in-slopes (3:1) were observed and the road surface was 23 feet wide. The Township maintenance staff indicates that there is muskrat activity near the low point of the road.

Muskrat activity can cause voids in the road bed and result in settlements or “sluffing” of the road edge, which can present a hazard to motorists. We recommend that the Township eradicate the muskrat activity to preserve the integrity of the road bed.

Estes Avenue. Estes Avenue uses a Chip Seal driving surface over a gravel base. The surface is 24 feet wide, which is adequate and meets Township standards. There is a T-turnaround at the termini, which appears adequate and the in-slopes are acceptable.

We recommend that a Chip Seal is scheduled and the estimated cost of the Chip Seal is \$11,760.

Endicot Avenue. The road utilizes a gravel surface and is approximately 20 feet wide. Some of the in-slopes are steeper than desirable. There is an offset cul-de-sac at the terminus of the road which is adequate.

We recommend that the Township consider correcting the in-slopes to a maintainable (4:1) slope. The estimated cost is \$15,000.

Dempsey Avenue (South of 127th Street). Dempsey Avenue utilizes a gravel surface and is approximately 16 feet wide. The minimum recommended road width by AASHTO for two-way traffic is 18 feet. There is a T-turnaround at the terminus, which is adequate. The Township may consider widening the road to provide a minimum 18 feet wide road surface.

127th Street. The road uses a Chip Seal driving surface over a gravel base. The surface is 24 feet wide, which is adequate and meets Township standards. The road appears to have adequate drainage and the in-slopes are acceptable.

We recommend that the Township consider a Chip Seal. The estimated cost is \$65,400.

Aladdin Avenue / 135th Street / Baker Avenue / 137th Street. The roads utilize a gravel surface and are primarily 22 feet in width, with the exception of 137th Street which was measured at 25 feet in width. There are some isolated locations with steeper in-slopes than desirable (2:1).

We recommend that the slopes steeper than 4:1 are corrected to improve the safety of the roadway. The estimated cost for the slope corrections is \$15,000.

Armitage Avenue (North of 120th Street). The road utilizes a Chip Seal surface over gravel and is 24 feet wide. The road appears to have adequate drainage and the in-slopes are acceptable.

We recommend that the Township consider a Chip Seal. The estimated cost of a chip seal is \$16,200.

Bishop Avenue. The road utilizes a gravel surface and is 24 feet wide. The in-slopes are acceptable and the drainage is adequate.

The road has been re-built and we recommend that the Township consider upgrading the surface to a paved surface.

105th Street and Amery Avenue. The road utilizes a gravel surface and varies in width from 18 feet to 22 feet. There are homes and detached garages in close proximity and lower in elevation than the road, which would make improvements difficult in its current condition. There is an adequate turn around at the terminus of the road.

We recommend that the Township consider correcting the slopes in the areas in which there is sufficient space. The estimated cost for the slope correction is \$20,000.

The Township may also consider vacating the road in its current alignment and shifting the road location. Shifting the alignment of the road would be beneficial as it would allow the road to be constructed to Township standards. It would also be beneficial to the property owners, as they would gain usable space. No estimate has been prepared for shifting the road as it is outside the scope of the study.

94th Street. The road utilizes a gravel surface and varies in width from 18 feet to 20 feet. There are large trees within 5 feet of the road edge and the road lacks a defined ditch for drainage. Several houses are lower than the road and there is a large hill near the end.

If improved, the Township may want to consider lowering the road with curb and gutter and hard surfacing to provide for better drainage. No estimate has been prepared for lowering and improving the road with curb and gutter as it is outside the scope of the study.

Amery Avenue South (Snake Trail Road). The road utilizes a gravel surface and appears to have adequate ditches. Some in-slopes are steeper than desirable. The cul-de-sac at the terminus is acceptable.

We recommend that the slopes are corrected to a 4:1 or flatter at an estimated cost of \$20,000.

92nd Street. The road utilizes a gravel surface and measures 18 feet in width. The in-slopes and drainage appear to be adequate. However, the turnaround at the end of the road is not adequate.

We recommend that the Township construct an adequate turnaround at the end of the road. The estimated cost is \$30,000.

91st Street and Bishop Avenue. The road utilizes a gravel surface and measures 21 feet to 23 feet wide. There are areas with steep in-slopes and other areas with inadequate ditches. The Township states that there are several areas with soft spots, particularly during the spring thaw. We recommend that the Township consider re-building the road to correct its deficiencies as budgets allow.

Bishop Avenue (Continues into Maple Lake). The road utilizes a gravel surface and is 18 feet wide. There are little to no ditches. The houses on the lake side of the road are lower than the road. We recommend that the Township excavate ditches where practical, which may be difficult due to the topography.

Duffield Avenue. The road utilizes a gravel surface and is 23 feet wide. It appears that the drainage is fair, but could be improved on the north end. There is one isolated area with steeper than desirable slopes for approximately 200 feet. We would recommend that the Township correct the in-slopes where they are deficient and excavate ditches to improve drainage. The estimated cost is \$15,000. The Township could consider Chip Sealing the surface in the future to reduce dust and maintenance costs.

110th Street. The road utilizes a gravel surface and is 16 feet wide. The minimum recommended width for two-way traffic by AASHTO is 18 feet. However, it appears that the road only serves two properties and therefore the width may be adequate. The turnaround is acceptable and the in-slopes and drainage appear to be adequate. The Town could consider Chip Sealing the surface in the future to reduce dust and maintenance costs.

Crofoot Avenue. The road utilizes a gravel surface and is 20 feet to 22 feet wide. The Township states that there is a soft spot that is approximately 400' long. The T-turnaround at the end of the road appears adequate. We recommend that the Town add gravel, particularly in the area of the soft spot, to add stability.

Bolton Avenue. The road utilizes a gravel surface and is 21 feet wide. The in-slopes and drainage appear to be adequate. There is some brush within the right-of-way that should be cleared.

Bice Avenue. The road utilizes a gravel surface and is 18 feet wide at the beginning and narrows to 16' at the end near the cul-de-sac. The cul-de-sac is located in close proximity to adjacent residential structures. In isolated locations the in-slopes are steeper than desirable. There is also a large tree within 5 feet of the road edge that is within the clear zone. We recommend that the Township consider vacating a portion of the road and shortening the Township maintained portion by constructing a cul-de-sac before the road narrows to 16 feet. We also recommend that the large tree is removed.

108th Street and Baker Avenue. The road utilizes a gravel surface and is 20 feet wide. Township maintenance staff has observed soft spots. The turnaround is located before the end of the road, which is not desirable. After the turnaround, the road narrows to 14 feet and provides access to four properties with no turnaround. AASHTO recommends that a minimum road width of 18 feet is provided for two-way traffic.

We recommend that the Township consider moving the road to the west such that a cul-de-sac can be constructed at the end of the road and the road can be constructed to Township standards. Preparing a cost estimate for shifting the road is beyond the scope of this study.

95th Street East. The road utilizes a gravel surface and is 19 feet wide. The in-slopes and drainage appear to be adequate with the exception of one area near a wetland. Minor in-slope correction is recommended for an estimated cost of \$5,000.

90th Street. The road utilizes a gravel surface and is 24 feet to 28 feet wide. The drainage appears to be adequate, however, the in-slopes could use correction to accommodate the higher traffic levels of the roadway. The Township could consider rebuilding the road and upgrading to a paved surface as budgets allow.

Dillon Avenue. The road utilizes a gravel surface and is 23 feet wide. The road narrows to 18 feet wide through a wetland and the in-slopes are steeper than desirable for approximately 500 feet. There is a snow trap on the south end due to the road elevations and the surrounding topography.

We would recommend that the Township rebuild the road to correct the slopes. The estimated cost is \$100,000.

Ellingwood and 107th Street. The road utilizes a gravel surface and is 20 feet wide. The drainage appears to be adequate, however, the in-slopes are steeper than desirable in locations. The turnaround at the end of the road appears to be adequate.

We would recommend that the Township correct the in-slopes for an estimated cost of \$10,000.

Endicot Avenue. The road utilizes a gravel surface and is 23 feet wide. There is a large tree within 5 feet of the surface that would be an obstacle to an errant vehicle. The drainage appears to be adequate, however, some of the in-slopes are steeper than desirable.

We recommend that the tree within the clear zone is removed and the in-slopes are corrected. We estimate the cost to be \$30,000.

95th Street West. The road utilizes a gravel surface and is currently a minimum maintenance road. If residences are added, tree clearing, in-slopes, and excavation of ditches would be necessary.

106th Street. The road utilizes a gravel surface and is 19 feet wide. The in-slopes and drainage appear to be adequate and a small amount of brush is located within the right-of-way. We recommend that the Township clear the brush within the right-of-way.

Ferman Avenue. The road utilizes a gravel surface and is 26 feet wide. The Township states that frost boils develop during the spring thaw for approximately 800 feet. The in-slopes and drainage appear to be adequate. The road is higher traffic and the Township may want to consider reconstructing and upgrading to a paved surface as budget allows.

Filmore Avenue. The road utilizes a gravel surface and is 22 feet wide. The Township maintenance staff state that frost boils develop during the spring thaw. We recommend that the Township consider rebuilding the entire road as budget allows.

Endicot Avenue. The road utilizes a gravel surface and is 20 feet to 22 feet wide. The drainage appears to be adequate and minor in-slope correction is recommended. Some brush was in the right-of-way, which is recommended to be removed. We would recommend future widening to accommodate the traffic as budgets allow.

156th Street. The road utilizes a gravel surface and is 19 feet wide. The in-slopes and drainage appear to be adequate. The road is not near other gravel roads for grading, and the Township may want to consider Chip Sealing the road in the future. Additionally, the Township may want to consider paving the cul-de-sacs to better withstand the turning movements. The estimated cost of a Chip Seal and cul-de-sac paving is \$49,800.

Elder Avenue. The road utilizes a Chip Seal surface over gravel and is 27 feet wide. The in-slopes and drainage appear to be adequate, with the exception of one area in downtown Hasty that requires excavation of ditches. We would recommend that the Township construct another layer of Chip Seal to preserve the road. The estimated cost of a Chip Seal is \$24,420.

150th Street. The road utilizes a gravel surface and is 22 feet wide. The in-slopes and drainage appear to be adequate. We would recommend that the Township consider Chip Sealing the road.

Curtis Avenue. The road utilizes a Chip Seal over gravel surface and is 26 feet wide. The in-slopes and drainage appear to be adequate. The Township should schedule this road for a Chip Seal in approximately 5 years. The estimated cost is \$33,150.

147th Street and Clementa. The road utilizes a gravel surface and is 21 feet wide. Ditching is necessary on the north side near Clementa Avenue. The Township maintenance staff indicates that there are soft spots in the low area near Clementa. The estimated cost of the improvements is \$30,000.

145th Street East. The road utilizes a gravel surface and is approximately 24 feet wide. There is a hill that obstructs sight distance that the Township should consider cutting down in the future to improve the safety of the road as budgets allow.

Barton Avenue and 155th Street. The road utilizes a Chip Seal over gravel surface and is 26 feet wide. The in-slopes and drainage appear to be adequate. Muskrats damaged the road near the south end and we recommend that the Township consider Chip Sealing that portion to preserve the roadway. The estimated cost of the Chip Seal repair is \$1,800. The estimated cost for Chip Sealing the roads is \$104,000.

Banyon Avenue and Baker Avenue. The road utilizes a gravel surface and is 16 feet wide. AASHTO recommends a minimum width of 18 feet for two-way traffic. The turnaround at the end of the road is adequate. The portion of road south of Banyon and Armitage does not appear necessary and we recommend that the Township consider vacating the portion that is not necessary.

Appleton Avenue. The road utilizes a gravel surface and is 24 feet wide. The in-slopes and drainage appear to be adequate. We recommend that the Township keep the brush back out of the right-of-way.

Clementa Avenue and 159th Street. The road utilizes a Chip Seal over gravel surface. Clementa Avenue is 24 feet wide and 159th Street is 18 feet to 20 feet wide. The in-slopes and drainage appear to be adequate. The turnaround appears adequate; however, the Chip Seal surface is showing wear from the turning movements. The Township may want to consider paving the turnarounds to withstand the turning movements. The estimated cost is \$37,120.

Maintenance of Gravel Roads

After initial construction, gravel roads require maintenance to keep the driving surface in good condition. Typical maintenance activities include blading the road with a motor grader several times throughout the year to provide a smooth surface and to remove wash boarding or rutting caused by environmental effects and traffic. Additionally, the Township must add gravel to the surface periodically to replace gravel lost into the environment. **When the Township places gravel, it is necessary to place 1,000 CY Per Mile of Roadway. The following summarizes the Township's Graveling Program:**

Through Road with High ADT – Every 3 Years

Through Road with Medium ADT – Every 4 Years

Low Volume Road – Every 5 Years

In general, roads that have higher traffic volumes require more maintenance and more frequent graveling than roads with lower traffic volumes. The amount of required maintenance can also vary based upon the quality of the initial construction of the road. Roads with a poorly constructed subgrade, or with an inadequate gravel section, will require maintenance on a more frequent basis. Further, roads with inadequate ditches or drainage will develop soft spots during the wet times of the year and will require additional maintenance.

Upgrading a Gravel Road to a Chip Sealed Surface

In many situations, gravel roads can be a cost-efficient means of providing property owner access. This is particularly true for roads with very low traffic volumes and/or provide access to only a few residential properties. However, as the traffic increases the maintenance costs also increase.

Constructing a double Chip Sealed Surface may be a cost-effective means to upgrade a driving surface if the traffic does not warrant upgrading to a paved road. There are several benefits to upgrading a gravel road to a Chip Sealed Surface, including:

- Reduced Maintenance Costs for Blading/Motor Grading
- Reduced Maintenance Costs for Adding Gravel every 3-5 years
- Reduced Dust (primarily a benefit to neighboring residents)

Prior to upgrading a gravel road to a Chip Sealed surface, the Township should verify the integrity of the roadway. We do not recommend constructing a Chip Sealed surface on roads that have soft spots, frost boils, inadequate drainage, or other deficiencies.

In order to analyze the economics of upgrading a gravel road to a Chip Seal surface, we recommend that the Township track the costs that are expended on maintaining its gravel roads. Maintenance costs would include: Costs of grading (costs of fuel, operator, etc.), capital costs of motor grader, costs of graveling. We recommend that the costs are annualized such that the Township can determine the point in which there is a financial benefit to upgrading a road to a Chip Sealed surface.

Note: at the time of writing this report, the Township owns its own gravel pit. We understand that the gravel pit is nearly depleted of its gravel and therefore we would recommend that the Township also analyze the cost of importing/purchasing gravel in its calculations.

Upgrading a Gravel Road to a Paved Road

In many situations, gravel roads can be a cost-efficient means of providing property owner access. The capital costs for upgrading a gravel surface to a paved road are often prohibitive when dealing with large lots. However, as the Average Daily Traffic (ADT) on a gravel road increases, the added cost for maintenance of that road can outweigh the capital costs of paving. A study prepared by the Local Road Research Board (LRRB) suggests that roads carrying traffic of 200 ADT are candidates for paving. Other factors, such as continuity of maintenance operations or continuity of a surface type on a given route should also be evaluated.

In addition to the strictly economic reasons for paving a gravel road, residents may request that a road be considered for paving for other reasons. Some reasons include a reduction in dust generated from the traffic, the cleanliness of cars, increase in property value, and overall perceived increase in quality of life.

Recommendations

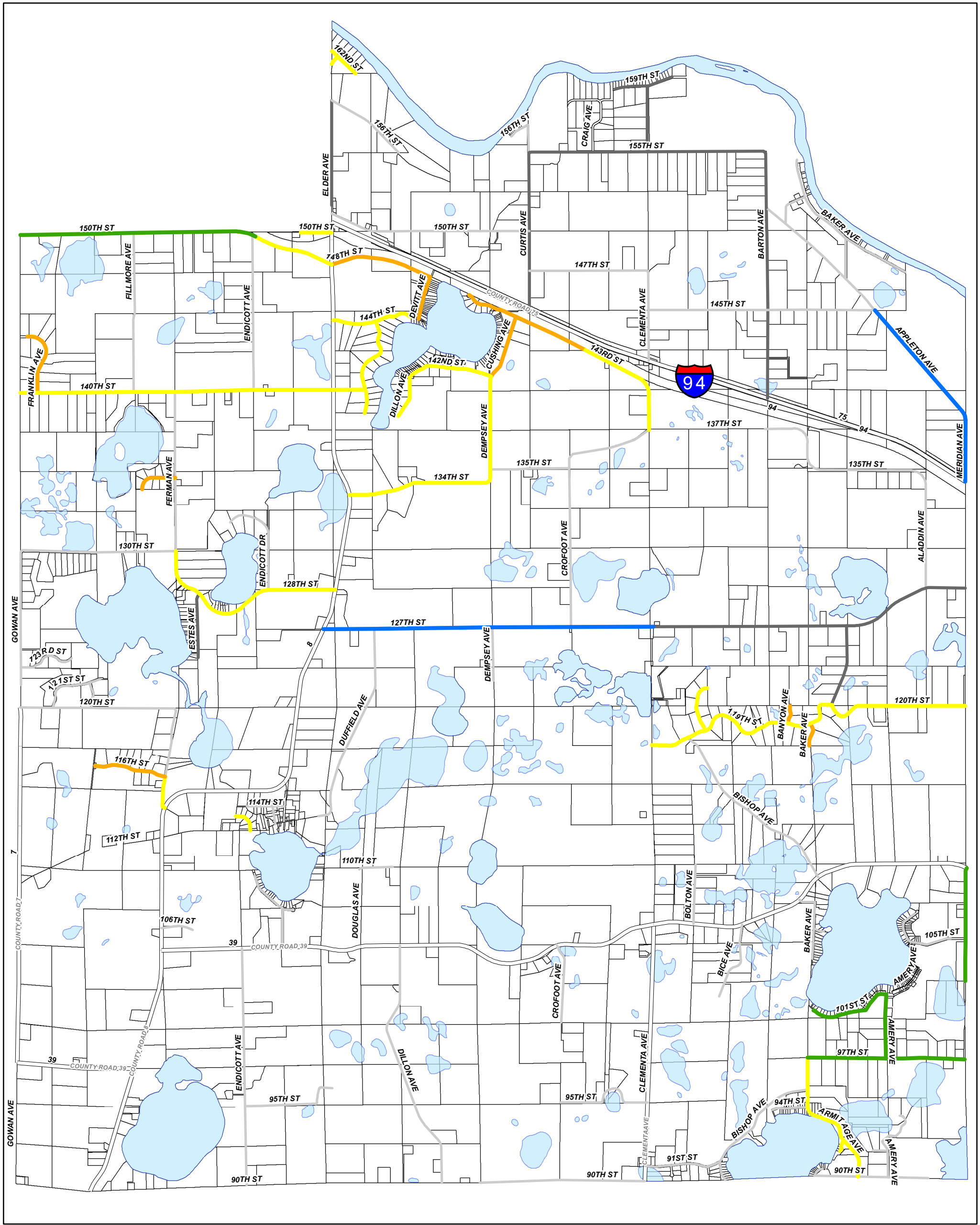
The data presented in the report should be used as a tool to determine what, if any, maintenance activities or rehabilitation techniques the Township wishes to utilize in the near future. The Township can use the costs presented within this report, along with other political and social factors, to prioritize desired projects. After the Township has prioritized projects and evaluated funding options, they can then program the desired projects into a five-year capital improvement program.

For gravel roads that the Township is considering upgrading, the Township should evaluate its maintenance costs for that specific road and obtain traffic volume counts to assist in the decision-making process. Additionally, gravel roads that are “out of the way” for maintenance activities, or provide an inconsistent surface for specific routes, should be considered as candidates for upgrading to a paved surface.

It is recommended that the Township evaluate its current assessment guidelines for capital improvement projects and determine what policies or funding levels will be utilized in the future.

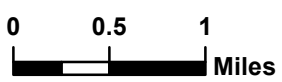
The “Total Backlog of Work” presented in this reported can be a useful tool in determining the Township’s effectiveness of meeting its goals for its roadway network. The current total backlog of work can be compared to other snapshots in time (i.e., 5-year increments) to determine the trends in the total backlog of work and associated trends in the conditions of the roadways.

APPENDIX A

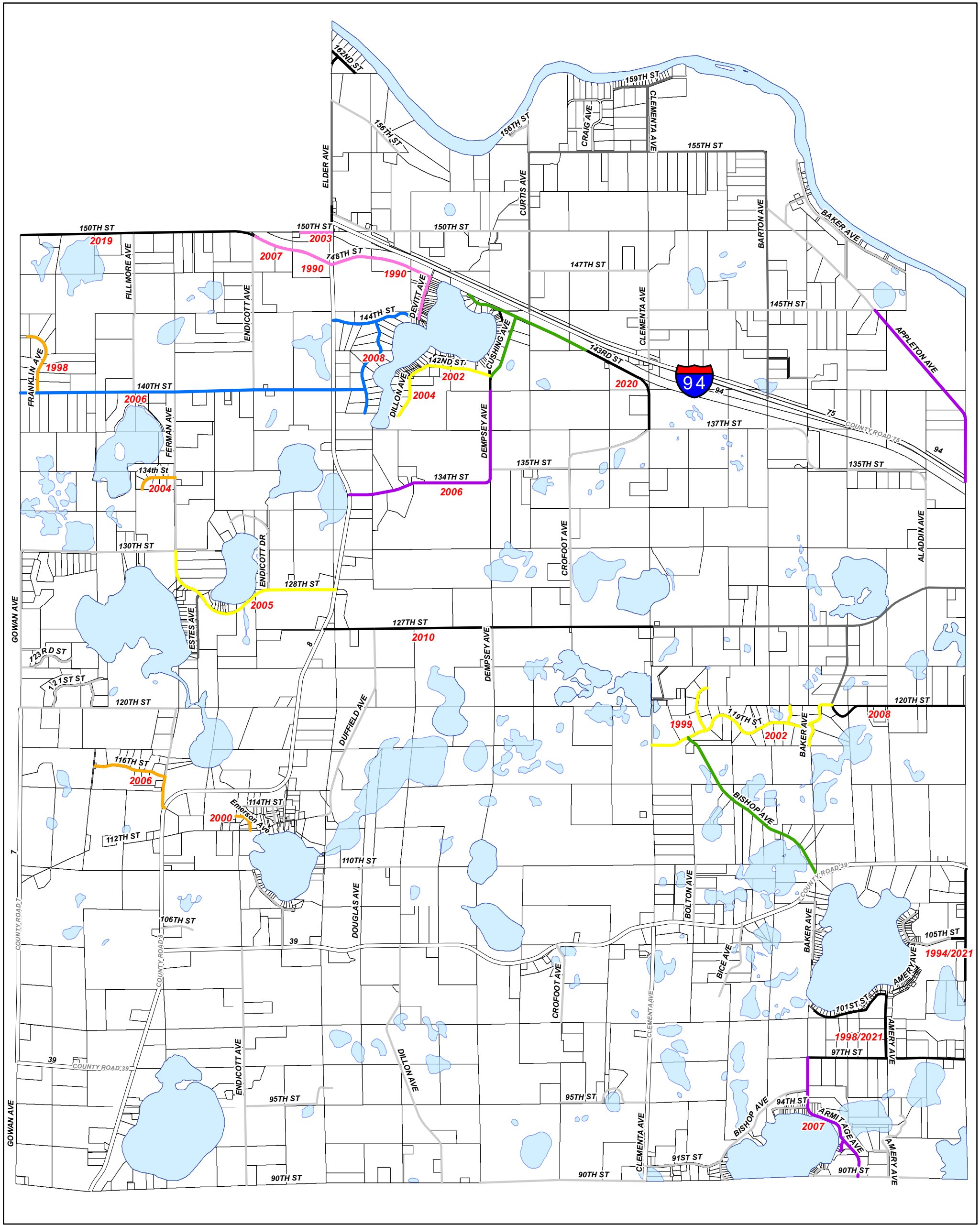


2022 Pavement Condition

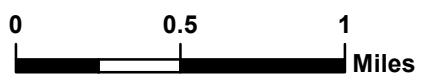
- VERY GOOD (4.2 mi)
- GOOD (3.4 mi)
- FAIR (12.5 mi)
- POOR (3.6 mi)
- VERY POOR (0.2 mi)
- CHIP SEAL
- GRAVEL



APPENDIX B



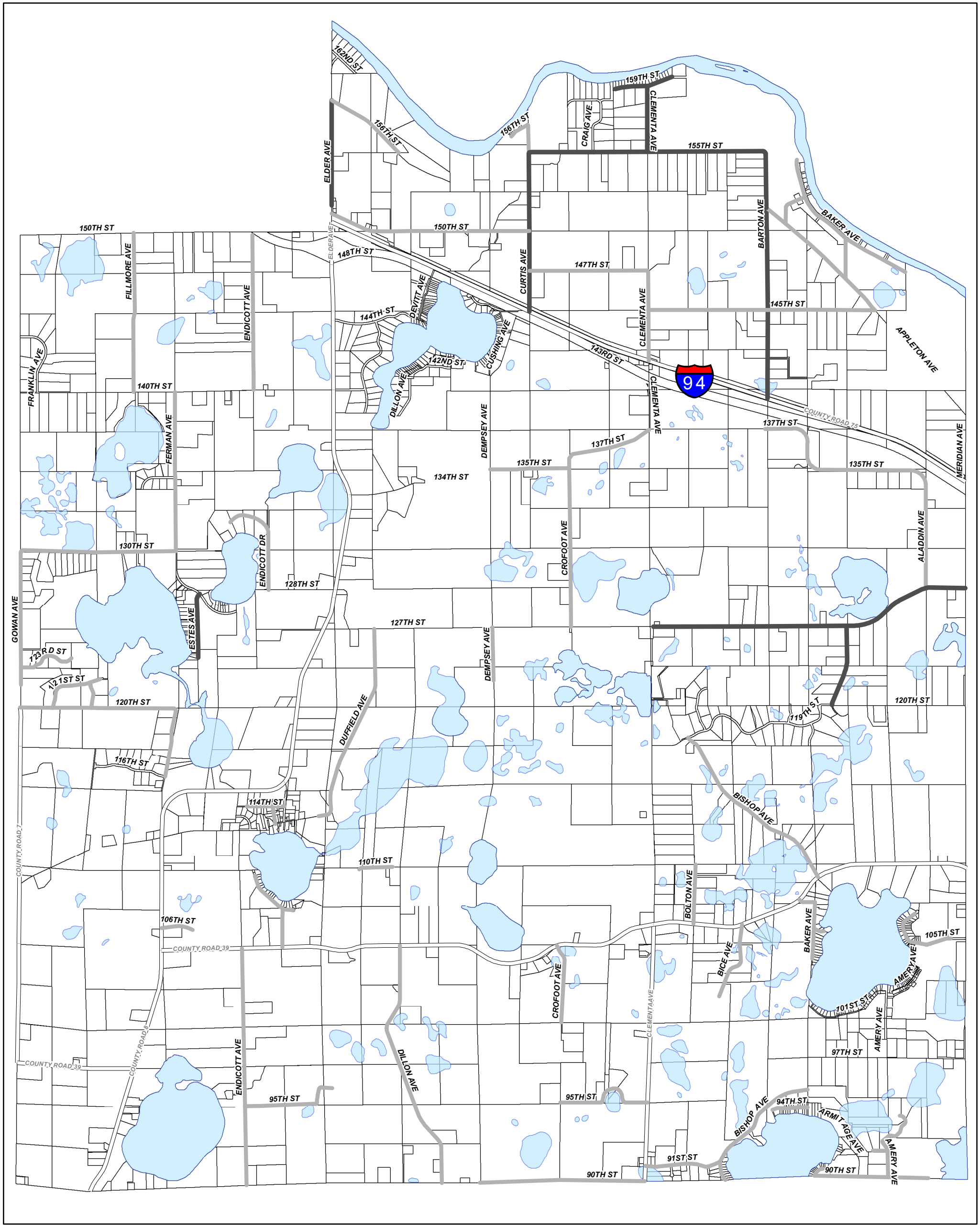
Paved Roads Capital Improvement by Year



- | | | | | | |
|--|----------------------------|--|------|--|----------------------------|
| | 2022 | | 2025 | | Chip Seal |
| | 2023 | | 2026 | | Gravel |
| | 2024 | | 2027 | | Other Paved Township Roads |
| | Original Construction Year | | | | |

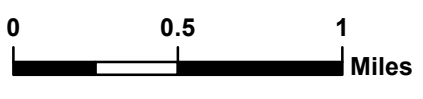


APPENDIX C



Gravel and Chip Seal Roads

- CHIP SEAL (8.5 mi)
- GRAVEL (34.5 mi)



APPENDIX D

Silver Creek Township
Capital Improvement Plan - Roads
2022 - 2027
(March 7, 2022)

2022					
Schedule "A" - Paved Roads Improvements					
Road	Mileage	Footage	Description	Est./LF	Est. Cost
143rd St / 145th St / Cushing Ave	1.3	6640	2" Overlay	\$ 26.00	\$ 172,640.00
Bishop Ave (2.5 inch Base)	1.2	6350	2.5" Base	\$ 27.00	\$ 171,450.00
Schedule "A" Total					
	2.5				\$ 344,090.00
Schedule "B" - Non-Paved Roads Improvements					
Road	Mileage	Footage	Description	Est./LF	Est. Cost
Elder Avenue	0.8	4070	Single Chip Seal	\$ 6.00	\$ 24,420.00
Barton (300' Repair Thru Swamp)	0.1	300	Single Chip Seal	\$ 6.00	\$ 1,800.00
156th Street	0.5	2900	Double Chip Seal	\$ 12.00	\$ 34,800.00
156th Street Cul-De-Sac	NA	NA	Pave	NA	\$ 15,000.00
Clementa / 159th Street	0.4	2020	Single Chip Seal	\$ 6.00	\$ 12,120.00
159th Street Cul-De-Sacs	NA	NA	Pave	NA	\$ 25,000.00
127th Street	2.1	10900	Single Chip Seal	\$ 6.00	\$ 65,400.00
Armitage Avenue	0.5	2700	Single Chip Seal	\$ 6.00	\$ 16,200.00
Estes Avenue	0.4	1960	Single Chip Seal	\$ 6.00	\$ 11,760.00
Schedule "B" Total					
	4.7				\$ 206,500.00
2022 Total - All Schedules					\$ 550,590.00

* Note: Footage Length above includes additional for equivalent cul-de-sac length where applicable

Silver Creek Township
Capital Improvement Plan - Roads
2022 - 2027
(March 7, 2022)

2023					
Schedule "A" - Paved Roads Improvements					
Road	Mileage	Footage	Maintenance	Est./LF	Est. Cost
148th St / Devitt Ave	1.0	5400	2" Overlay	\$ 27.00	\$ 145,800.00
148th Street (Truck Stop)	0.5	2750	2" Overlay	\$ 27.00	\$ 74,250.00
150th Street (1/2 Clearwater)	0.2	1050	2" Overlay	\$ 27.00	\$ 28,350.00
Bishop Wear Course	1.2	6350	1.5" Overlay	\$ 19.00	\$ 120,650.00
Schedule "A" Total					
	2.9				\$ 369,050.00
Schedule "B" - Non-Paved Roads Improvements					
Road	Mileage	Footage	Maintenance	Est./LF	Est. Cost
Schedule "B" Total					
	0.0				\$ -
2023 Total - All Schedules					\$ 369,050.00

* Note: Footage Length above includes additional for equivalent cul-de-sac length where applicable

Silver Creek Township
Capital Improvement Plan - Roads
2022 - 2027
(March 7, 2022)

2024					
Schedule "A" - Paved Road Improvements					
Road	Mileage	Footage	Maintenance	Est./LF	Est. Cost
Franklin Avenue	0.5	2600	Reclaim + Pave	\$ 86.00	\$ 223,600.00
134th Street	0.3	1500	Reclaim + Pave	\$ 86.00	\$ 129,000.00
116th Street	0.5	2600	Reclaim + Pave	\$ 86.00	\$ 223,600.00
Ferman Avenue (116th St to CR 8)	0.2	1160	2" Overlay	\$ 28.00	\$ 32,480.00
Emerson Avenue	0.2	800	2" Overlay	\$ 28.00	\$ 22,400.00
Schedule "A" Total					
	1.6				\$ 631,080.00
Schedule "B" - Non-Paved Road Improvements					
Road	Mileage	Footage	Maintenance	Est./LF	Est. Cost
Curtis Avenue	1.0	5100	Single Chip Seal	\$ 6.50	\$ 33,150.00
155th Street	1.5	7850	Single Chip Seal	\$ 6.50	\$ 51,025.00
Barton Avenue	1.5	8150	Single Chip Seal	\$ 6.50	\$ 52,975.00
Schedule "B" Total					
	4.0				\$ 137,150.00
2024 Total - All Schedules					\$ 768,230.00

* Note: Footage Length above includes additional for equivalent cul-de-sac length where applicable

Silver Creek Township
Capital Improvement Plan - Roads
2022 - 2027
(March 7, 2022)

2025					
Schedule "A" - Paved Roads Improvements					
Road	Mileage	Footage	Maintenance	Est./LF	Est. Cost
142nd Street / Dillon Ave	0.8	4250	2" Overlay	\$ 29.00	\$ 123,250.00
128th Street	1.3	7000	2" Overlay	\$ 29.00	\$ 203,000.00
119th Street / Blackwood	1.7	9050	2" Overlay	\$ 29.00	\$ 262,450.00
Banyon / Baker Ave	0.3	1550	Reconstruct Surface	\$ 90.00	\$ 139,500.00
Schedule "A" Total					
	4.1				\$ 728,200.00
Schedule "B" - Non Paved Roads Improvements					
Road	Mileage	Footage	Maintenance	Est./LF	Est. Cost
Schedule "B" Total					
	0.0				\$ -
2025 Total - All Schedules					\$ 728,200.00

* Note: Footage Length above includes additional for equivalent cul-de-sac length where applicable

Silver Creek Township
Capital Improvement Plan - Roads
2022 - 2027
(March 7, 2022)

2026					
Schedule "A" - Paved Roads Improvements					
Road	Mileage	Footage	Maintenance	Est./LF	Est. Cost
140th Street	2.0	10560	2" Overlay	\$ 31.00	\$ 327,360.00
140th Street / Duffield Ave / 144th Street	1.4	7300	2" Overlay	\$ 31.00	\$ 226,300.00
Schedule "A" Total					
	3.4				\$ 553,660.00
Schedule "B" - Non Paved Roads Improvements					
Road	Mileage	Footage	Maintenance	Est./LF	Est. Cost
Schedule "B" Total					
	0.0				\$ -
2026 Total - All Schedules					\$ 553,660.00

* Note: Footage Length above includes additional for equivalent cul-de-sac length where applicable

Silver Creek Township
Capital Improvement Plan - Roads
2022 - 2027
(March 7, 2022)

2027					
Schedule "A" - Paved Roads Improvements					
Road	Mileage	Footage	Maintenance	Est./LF	Est. Cost
134th Street / Dempsey Avenue	1.6	8300	2" Overlay	\$ 32.00	\$ 265,600.00
Appleton / Meridian	1.3	6900	2" Overlay	\$ 32.00	\$ 220,800.00
Armitage Avenue	0.9	4900	2" Overlay	\$ 32.00	\$ 156,800.00
Schedule "A" Total					
	3.8				\$ 643,200.00
Schedule "B" - Non Paved Road Improvements					
Road	Mileage	Footage	Maintenance	Est./LF	Est. Cost
Schedule "B" Total					
	0.0				\$ -
2027 Total - All Schedules					\$ 643,200.00

* Note: Footage Length above includes additional for equivalent cul-de-sac length where applicable

APPENDIX E

Assessment of Age of Silver Creek Blacktop Roads January 9, 2013

1) 148 th St and Devitt Ave West Side of Locke Lake.	1990
2) 143 rd St 145 th St Clementa Ave East of Locke Lake.	1992
3) 119 th St (Witchen) put in 1992 redone 2002 except for stubs.	1992
4) Appleton Ave Meridian Ave Barton Pit.	1994
5) Meridian Ave Town Line Road South of Cty 39.	1994
6) Mississippi Oaks Development.	1996
7) 97 th St Amery Ave 101 st St Lake Ida Access. Base course 1997.	1998
8) Deer Haven Development Franklin Ave.	1998
9) Maria Country Estates 119 th St and Blackwood Ave.	1999
10) Silver Creek Additions Emerson Ave.	2000
11) 142 nd St and Cushing Ave South Side Locke Lake.	2002
12) Highland Estates 134 th ST off Ferman Ave.	2004
13) Nessie Acres Dillon Ave Locke Lake.	2004
14) Town of Hasty.	2004
15) 128 th St from Cty 8 to 130 th .	2005
16) 140 th St from Cty 8 west to end.	2005
17) 134 th St from Cty 8 to Cushing Ave.	2006
18) Ferman Ave and 116 th Silver Creek Heights	2006
19) North part of Meridian patch South of Cty 39.	2006
20) 120 th ST from 119 th ST to Line, 148 th St to Line.	2008
21) Armitage Ave Eagle Lake Access.	2007
22) 140 th Duffield west side acres redo 144 th Locke Lake preserve new	2008
23) 127 th St from Cty 8 to Cty 111.	2010
24) 150 th St NW From Endicott Ave into Clearwater Twp	2019

APPENDIX F

10-1-19 to 10-7-19	90 th St at Cty Rd 11	746	124avg.
10-1-19 to 10-7-19	91 st St at Cty Rd 11	637	106avg.
10-1-19 to 10-7-19	Armitage Ave at 90 th St With)	699	117avg. (Tampered
10-7-19 to 10-14-19	143 rd St on Dead end Sign Pub Access	727	104 Avg.
10-7-19 to 10-14-19	143 rd St and Clementa on Curve Sign 3 Days Missing)	640	91 avg (Tampered with
10-7-19 to 10-14-19	Cushing Ave and 143 rd St JD Dave's	1567	224avg.
10-22-19 to 10-29-19	Intersection of 130 th st and Ferman av.	2082	297avg.

Traffic Counts 2020

9-2-20 to 9-9-20	Meridian Ave S of 107 th	5391	770avg.
9-2-20 to 9-9-20	East End of 97 th and Meridian Av	3663	524avg.
9-2-20 to 9-9-20	Armitage Av and 90 th St	1759	252avg.
9-9-20 to 9-16-20	East End Bishop Av at Armitage Av	1232	176avg.
9-9-20 to 9-16-20	West End 91 st St at Cty #11	1490	213avg.
9-16-20 to 9-23-20	Gowan Av at Cty #7	Not Working	
9-16-20 to 9-23-20	130 th St at Ferman	1632	233avg.
9-16-20 to 9-23-20	Ferman Av at 130 th St	1262	180avg.
9-16-20 to 9-23-20	Ferman Av at 140 th St	3067	438avg.
9-25-20 to 10-2-20	Co Rd 111 and 119 th st	1840	263avg.
9-25-20 to 10-2-20	Rebuild Bishop at 119 th	580	83avg.
9-25-20 to 10-2-20	119 th and 120 th on by curve sign	1311	188avg.
10-2-20 to 10-9-20	127 th east by Gary Nelson	2757	394avg.
10-2-20 to 10-9-20	Aladdin Av South of Ryan Nelson	727	104avg.
10-2-20 to 10-9-20	Armitage Av and 127 th St	974	140avg.
10-2-20 to 10-9-20	120 th East	1926	276avg.
10-9-20 to 10-19-20	127 th St at TDS Building	2368	237avg.
10-9-20 to 10-19-20	127 th St W of County 111	6149	615avg.
10-9-20 to 10-19-20	127 th St and Crofoot Av	492	49avg.

Traffic Counts 2016

5-16-16 to 5-23-16	91 st ST west end	1137	163 avg.
5-16-16 to 5-23-16	Bishop Ave East End	1172	165 avg.
5-16-16 to 5-23-16	143 rd ST East of Locke Lake	1233	176 avg.
5-23-16 to 6-01-16	137th St Baker Rest Area Aladdin	766	85 avg.
5-23-16 to 6-01-16	Bishop Ave North End (119th)	578	64 avg.
5-23-16 to 6-01-16	Bishop ave South End (Cty 39)	1366	155 avg.
6-01-16 to 6-13-16	127th St and Aladdin Ave	3898	325 avg.
6-06-16 to 6-13-16	127th St and Cty 111	963	139 avg.
6-06-16 to 6-13-16	Armitage Ave at 119th st	687	97 avg.
6-13-16 to 6-20-16	Amery Ave at 97th st to lake Ida	2012	287 avg.
6-13-16 to 6-20-16	97th st at Meridian Ave	3909	558 avg.
6-13-16 to 6-20-16	Armitage Ave at 90th St Eagle Lake	1414	202 avg.
6-20-16 to 6-27-16	Meridian Ave North	4917	712 avg.
6-20-16 to 6-27-16	105th st nw off of meridian ave.	1124	165 avg.

Traffic Counts 2017

4-19-17 to 4-27-17	Elder Ave and County Road 75	2893	362 avg.
4-27-17 to 5-4-17	Endicott Ave and 148th St	860	123 avg.
5-4-17 to 5-9-17	Fillmore Ave and 150th St	1517	119 avg.
6-20-17 to 6-27-17	Bishop Ave and 119 th St	624	89 avg.
6-20-17 to 6-27-17	Bishop Ave and Cty Rd 39	1391	199 avg.
6-20-17 to 6-27-17	Bishop 39 our counter	1879	268 avg.

Traffic Counts 2019

9-16-19 to 9-23-19	Meridian ave at County Rd 39	1115	185avg.
9-16-19 to 9-23-19	Meridian ave at south of 107 th St	5068	7244avg.
9-16-19 to 9-23-19	97 th St at House #38	3277	468avg.
9-23-19 to 9-30-19	Amery Ave at 97 th st	1687	241avg.
9-23-19 to 9-30-19	Armitage Ave S.of Bishop Curve sign	1174	168ave.
9-23-19 to 9-30-19	Bishop Ave W.of Arm. At Curve Sign	949	136avg.

10-9-20 to 10-19-20 127th St at County Rd 8

10608

1061avg.