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MEMORANDUM

CASS COUNTY COMMISSION

**Highway  
Department**

Jason Benson, P.E.  
County Engineer

Richard S. Sieg  
Superintendent

Thomas B. Soucy, P.E.  
Design and Construction  
Engineer

TO: Cass County Commission

FROM: Jason Benson, County Engineer *JB*

DATE: August 24, 2012

SUBJECT: Agenda topic for September 4, 2012 Commission Meeting:  
Adoption of the 2013-2017 Comprehensive Highway Plan

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The County Highway Department annually schedules next year's construction projects during the budget process. Although this process offers a great deal of flexibility in scheduling it can lead to some inefficiency in the planning process. In an effort to increase efficiency and maintain a high level of transparency a Cass County Comprehensive Highway Plan has been developed.

The Plan acts as a document that more efficiently displays our data and serves as a 5 year Capital Improvement Plan (CIP). The plan is anticipated to be revisited annually. Included in the plan is a discussion of land use, highway safety, maintenance, and construction. A large amount of data is used for preparing the plan, but rather than displaying this data, maps are used to display what is most pertinent in an effort to make the plan more user-friendly and easier to update.

The Plan was presented in draft form to the Road Advisory Group Committee in March and to the Cass County Planning Commission on June 28, 2012. Cass County Planning Commission has made a motion to formally recommend approval of the Cass County Comprehensive Highway Plan to the Commission. The Final Draft of the Plan was presented and approved by the Road Advisory Group Committee on July 16<sup>th</sup>, 2012.

**SUGGESTED MOTION:**

Adopt the 2013-2017 Comprehensive Highway Plan as an illustrative plan that provides future guidance for project planning and for this plan to be reviewed and updated annually.

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# ***Cass County Comprehensive Highway Plan***

***2013-2017***



***Cass County Highway Department***

***Cass County, North Dakota***

This document was prepared pursuant to NDCC 11-31-03.2 and is intended to be used for internal planning purposes. Data used herein is deemed to be accurate; however is not all-encompassing. Maps within are graphical displays of conditions at the time of preparation and are not to be used as a substitute for an accurate field survey.

## [Table of Contents](#)

<u><a href="#">Plan Purpose</a></u> .....	1
<u><a href="#">Plan Updates and Proponent for Changes in this Plan</a></u> .....	1
<u><a href="#">Summary</a></u> .....	1
<u><a href="#">Existing and Future Land Use</a></u> .....	2
<u><a href="#">Highway Safety</a></u> .....	3
<u><a href="#">Permitting</a></u> .....	4
<u><a href="#">Funding Maintenance and Construction</a></u> .....	5
<u><a href="#">Cass County Highways: Current Status of Paved Highways</a></u> .....	6
<u><a href="#">Cass County Highways: Current Status of Gravel Highways</a></u> .....	7
<u><a href="#">Bridge Maintenance and Construction</a></u> .....	7
<u><a href="#">Cass County Bridges: Current Status of 20 foot or longer Bridges on County Highways</a></u> .....	8
<u><a href="#">Cass County Bridges: Current Status of 20 foot or longer Bridges on Township Roads</a></u> .....	8
<u><a href="#">Cass County Bridges: Current Status of Bridges less than 20 feet in Length</a></u> .....	8
<u><a href="#">2013-2017 Paved Highway Improvement Plan</a></u> .....	8
<u><a href="#">2013-2017 Gravel Road Improvement Plan</a></u> .....	10
<u><a href="#">2013-2017 Bridge Improvement Plan</a></u> .....	11
<u><a href="#">2013-2017 Revenues vs Project Costs</a></u> .....	12
Appendix 1. County Highways: 2013-2017 Capital Improvement Plan .....	13
Appendix 2. County Highways: PCI Rating .....	14
Appendix 3. County Highways: Last Year Paved .....	15
Appendix 4: County Highways: Last Year Sealed .....	16
Appendix 5: County Bridge Ratings: ND DOT 2009/2010 Inspection Report – County Roads .....	17
Appendix 6: County Bridge Ratings: ND DOT 2009/2010 Inspection Report – Township Roads .....	18

## *Plan Purpose*

Cass County operates and maintains a highway system, which in conjunction with local, regional, and state systems, helps to serve the transportation needs of its residents and businesses. The Cass County Transportation Plan provides the framework for development of the long range highway and bridge planning guidance for 2013-2017. The Plan describes system principals and standards, evaluates the existing County transportation system, identifies future system needs, develops a maintenance plan, identifies funding sources, and outlines strategies to implement the Plan. This Plan provides the framework for decisions regarding the nature of roadway infrastructure improvements necessary to develop a safe and efficient roadway system.

## *Plan Updates and Proponent for Changes in this Plan*

The Cass County Engineer is the chief proponent for updates to the Cass County Highway Transportation Plan. Working in conjunction with the Cass County Engineering Supervisor and County Planner, updates will be approved through the Road Advisory Committee and the Cass County Commission.

This five year plan will serve as a living document that will be updated annually to maintain a long range focus while allowing for flexibility due to flooding, changes in construction costs, and other considerations. This plan will be reviewed and updated in June of each year. The updated plan will then be forwarded to the Road Advisory Committee for approval during the July rotational meeting. This updated plan will then be sent to the County Commission for final approval. The updated plan will provide the future project costs and will serve as the basis for the Highway Department's annual highway and bridge budget line items.

## *Vision and Mission*

**Vision** - To be recognized as a premiere county road program in the Northern Plains states.

**Mission** - To provide and maintain an efficient, safe, environmentally sensitive, and cost effective county road system that effectively meets the citizen's needs for personal mobility and the movement of freight consistent with the importance of the economy.

## *Summary*

The 2013-2017 Cass County Highway Transportation Plan was prepared to assist staff and decision makers in planning for maintenance and capital improvements to the County Highway System. Funding for road improvements is very limited; therefore resources must be used carefully to ensure the highest return to taxpayers. The Cass County highway system consists of nearly 700 miles of roadway covering more than 1,700 square miles as well as responsibility of approximately 500 bridges of which 268 span a distance of 20 feet in length or greater.

Safe, efficient, and responsive transportation infrastructure is necessary to the incidents of commerce, public safety, recreation, and education. Two goals in the 2005 Cass County Comprehensive Plan describe Cass County's commitment to transportation:



**2005 Cass County Comprehensive Plan Goal Two:** *“To provide the citizens of Cass County with essential public facilities, services, and infrastructure.”*

**2005 Cass County Comprehensive Plan Goal Three:** *“To provide an efficient, safe, environmentally sensitive, and cost effective county transportation system to effectively meet citizen’s current and future needs for personal mobility and movement of goods.”*

This plan has been developed through compiling data from multiple sources including:

- State of North Dakota Department of Transportation (ND DOT)
- Fargo Moorhead Metropolitan Council of Governments (FM Metro COG)
- Braun Intertec Corporation (Braun)
- Cass County Highway Department
- Cass County Planning Department
- Cass County GIS Department
- Cass County Tax Equalization

The Highway Department is continuing to develop its inventory of data including an analysis of structures under 20 feet in length, inventory of signage on County Highways, geo-locating culverts and approaches on County Highways, inventory of ditch grades of all County Highways, and continued development of characteristics of each road segment. Collecting this data will further improve the County’s asset management program.

Further, the plan works in concert with various regional plans and corridor studies. Staff works closely with FM Metro COG, ND DOT, and other entities of the County in planning and programming new projects. The Metropolitan Long Range Transportation Plan guides development of the transportation system in the Fargo Moorhead Metropolitan Area, along with this larger plan FM Metro COG has completed a number of complimentary studies that offer guidance to programming.

The development of a Regionally Significant Transportation Infrastructure in the Traffic Operations Incident Management Strategy identifies the importance of moving traffic quickly in times of disaster. Some County Highways have been identified in this strategic plan and are noted as new projects are programmed. FM Metro COG through the Metro Bike/Ped Committee also creates a Bicycle and Pedestrian Master Plan every five years which helps to identify needs in the system for accommodating alternate modes of traffic. Along with these plans specific corridor studies assist most specifically for County highways in the Metro area in order to anticipate or respond to necessary improvements to the system.

### **Existing and Future Land Use**

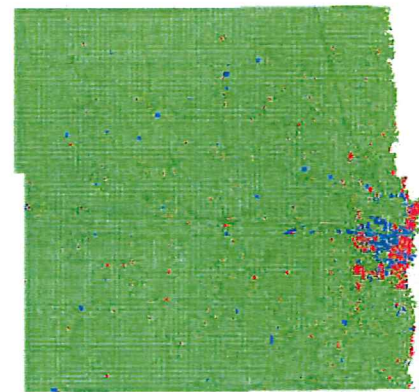
The Fargo Moorhead metropolitan area has seen tremendous growth in recent years. The economic prosperity of the metro has contributed to the growth in the surrounding communities along with the individual



successes of these communities of their own as well. The 1990 Census for Cass County was 102,874 growing to 123,138 in 2000, and grew at a 21.6% rate to 149,778 in 2010. In addition to utilizing Census data to project growth, Cass County participates with the Fargo Moorhead Metropolitan Council of Governments in researching demographic trends as part of its long range transportation planning and modeling. It is anticipated that by the year 2030 population in Cass County could grow to over 200,000. Table 1 illustrates population in the County's largest cities.

Table 1 - Population - US Census			
City	1990 Census	2000 Census	2010 Census
Fargo	75,111	90,559	105,549
West Fargo	12,287	14,940	25,830
Horace	662	915	2,430
Casselton	1,602	1,855	2,329
Mapleton	682	606	762
Harwood	590	607	718
Kindred	569	614	692

Despite the growth and importance of the metro area the County as a whole remains primarily agricultural. Ninety-seven percent of the approximately 1.13 million acres of land in Cass County are used for agricultural purposes. Map 1 illustrates this by showing agricultural land uses in green, commercial in blue, and residential in red. It becomes evident that the County's land use is predominately agricultural.



Map 1: Existing Land Use

Further, the County has committed to promote development only in areas that can adequately accommodate it. Goal One of the Cass County Comprehensive Plan: *"To achieve orderly,*

*balanced, and sensible development"* includes objectives that pursue that goal and prevent incompatible land uses thus preventing a need for large infrastructure improvements in areas that currently are rural in nature. Goal Five: *"To preserve and maintain Cass County's rural heritage"* further emphasizes the desire of the County to continue its existing land use.

### Highway Safety

Cass County and its agents have committed to maintaining the safest network of roads possible. The planning process takes into account road safety by implementing the most effective practices available. Commitment to educating the public, roadway safety improvements, sign maintenance and improved signing, routine road maintenance, and operational safety are all components of each project.





All new construction and maintenance overlays include the use of rumble strip installation to separate the roadway from the shoulder while leaving on-off gaps for bicycle safety. This method can help reduce accidents that occur from running off the road. Intersection improvements and safety enhancements also are implemented where collisions have historically happened or where it may be likely. Improvements such as flashing signals and stop signs, rumble strips, and improved signage have proven successful in past projects. Striping is performed annually on all paved County Highways.

Highway Access Ordinance #2007-1 was developed to reduce the amount of access to the County Highways for more efficient and safe operation. With design speeds on County Highways at 55 mph the reduction of access to one per ¼ mile a County Highway is able to operate with less interruption and more predictable intersections. In addition, the Ordinance regulates the design of the approach by increasing the slope of the approach to reduce severity in off road crashes.

Cass County uses crash data provided by ND DOT in planning and implementing safety enhancements. When significant crashes occur on Cass County Roads a general reconnaissance is performed by the County Engineer or Highway Superintendent to assess the road condition and variables that may be present.

### **Signs and Traffic Control Devices**

Cass County utilizes the 2009 Edition of the Manual on Uniform Traffic Control Devices (MUTCD) from the US Department of Transportation, Federal Highway Administration. This MUTCD is the standard for traffic control devices and has been adopted by the NDDOT. Cass County maintains an inventory of their signs indicating condition and location in a geo-database.

### **Permitting**

Related to safety and maintenance the County relies on various permitting procedures to uphold the mission of the Department. Ordinance #2005-2 regulates over dimension vehicles to ensure the safe practices and avoidance of damage to County Highways. Similarly the County annually enacts Spring Load Restrictions to avoid damage to the road surface and subgrade during the wet months of Spring. The County also permits use of its right of way for utilities which includes provisions to ensure safe operation during construction activities on or near the roadway. There is also a permitting process for ditch cleaning to better inventory what is being done and to ensure that the water resource district is adequately notified.

The County Planning Office also administers the Subdivision Ordinance which regulates growth in the County and efficiently accommodates for new roads and land use changes that may affect the County Highway System. The County Engineer reviews all new developments and assists in advising the Planning Commission. And as previously discussed, the County actively permits any new access to County Highways through Ordinance #2007-1, the Highway Access Ordinance.

## Funding Maintenance and Construction

The County relies upon a combination of the 23 cent state fuel tax, state motor vehicle license fees, federal road and bridge funds, and local property tax. Other items such as permit fees make up a very small portion of the budget. Cass County also continually pursues grant funding opportunities as they become available.

The cost of rebuilding roads continues to increase. Rebuilding just one mile of road can cost up to one million dollars. In light of this reality it is important to maintain a road maintenance policy to reduce the need for reconstruction.

An asphalt highway generally requires a maintenance overlay every 15-20 years. Current costs of a typical asphalt overlay in Cass County can range from \$200,000 - \$450,000 per mile depending on road width and thickness of the asphalt overlay, with the most frequent 36' Top 2.5" overlay being approximately \$300,000 per mile. Under the desired maintenance schedule an overlay would occur every 17 ½ years. Given the current inventory in Cass County we could assume to schedule approximately 17 miles of asphalt overlay per year; using the rate of \$300,000 per mile we can estimate a cost of \$5.1 million per year. If pavements are not overlaid with a new asphalt surface before they deteriorate they will require full reconstruction.

Table 2 below shows the estimated revenue for the Cass County Highway Department from 2013 through 2017. This estimate is based on a 2% increase in annual revenues. It does not include any projections for special Legislative funding similar to what Cass County received in 2011 and 2012. Estimated annual Federal Aid Highway funding is \$1.22 million. This chart does not include the additional Federal Aid Funding for Bridge projects. Federal Aid Bridge funding is based on need as the NDDOT has \$5.0 million allocated state wide for county bridges.

Revenue Description	2013	2014	2015	2016	2017
Property Tax	\$4,287,621	\$4,373,373	\$4,460,841	\$4,550,058	\$4,641,059
Highway Distribution Tax	\$6,309,047	\$6,435,228	\$6,563,932	\$6,695,211	\$6,829,115
Other	\$151,863	\$154,901	\$157,999	\$161,158	\$164,382
Total Revenues	\$10,748,531	\$10,963,502	\$11,182,772	\$11,406,427	\$11,634,556
Federal Aid Highway Funding	\$1,220,000	\$1,220,000	\$1,220,000	\$1,220,000	\$1,220,000
Total Revenues & Federal Aid	\$11,968,531	\$12,183,502	\$12,402,772	\$12,626,427	\$12,854,556
Total Operating Cost (not including Road/Bridge Projects)	\$3,579,261	\$3,650,846	\$3,723,863	\$3,798,340	\$3,874,307
Total Available for Road/Bridge Projects	\$8,389,270	\$8,532,656	\$8,678,909	\$8,828,087	\$8,980,249

## Cass County Highways: Design Standards for New or Reconstruction of Existing Facilities

The typical section of a County Highway is rural in nature with two lanes, either paved or gravel surface. Different modes of travel and location of roadway to population centers, agricultural points of traffic, or



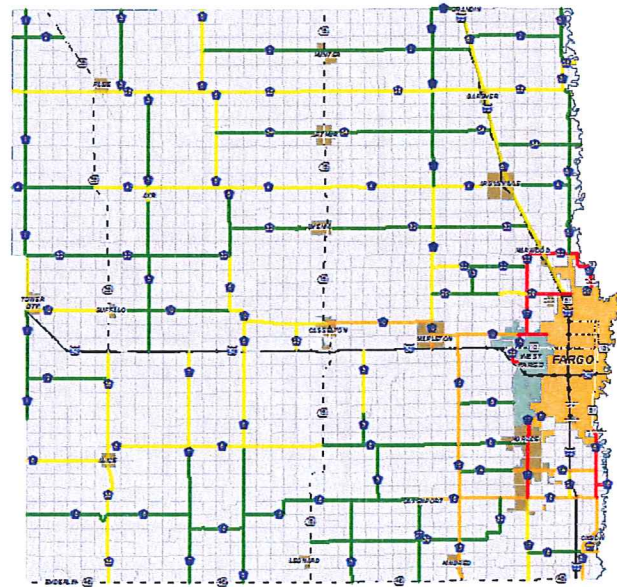
schools sometimes requires different needs. Further drainage needs may vary from roadway to roadway. Table 3 summarizes the Design Standards for New or Reconstruction of Existing Cass County Highways.

*Table 3 - Minimum Design Standards for New or Reconstruction of Existing Infrastructure*

Typical Section	Design Speed	Right of Way	Road Width	Turn Lanes	Min. Section Thickness	Access Controls	Bike/Ped Facilities
Two-Lane Township Gravel Section	55 mph	66 feet	28 ft	no	4" Gravel	1/4 mile spacing	N/A
Two-Lane Rural Gravel Section	55 mph	200 feet	28 ft	no	6" Gravel	1/4 mile spacing	N/A
Two-Lane Rural Paved Section	55 mph	200 feet	32 ft	no	12" Base + HBP	1/4 mile spacing	4 ft paved shoulder
Two-Lane Village Paved Section	25 mph	200 feet	32 ft	no	12" Base + HBP	Varies	4 ft paved shoulder
Two-Lane City Paved Section	25 mph	200 feet	36 ft	no	12" Base + HBP	Varies	6 ft paved shoulder
Two-Lane Metro Paved Section	40-55 mph	200 feet	36 ft	no	12" Base + HBP	1/4 mile spacing	6 ft paved shoulder
Three-Lane Metro Paved Section	40-55 mph	200 feet	50 ft	1/4 mile spacing	12" Base + HBP	1/4 mile spacing	6 ft paved shoulder and separated path

\*Note: 4:1 minimum inslope, 3:1 minimum backslope, 0.05% ditch grade, 24" minimum culvert, 8' minimum ditch bottom width on all rural highway sections; minimum HS-25 design load, 5 year storm design on all bridges

Cass County has prioritized roads to assist in such issues as maintenance, striping, and snow removal. Priorities are used to determine which roads are plowed first and the schedule for which maintenance or construction projects will be completed. Priorities are developed by the County Engineer by considering average daily traffic volumes, pavement condition, as well as important points of need such as schools, cities, and commerce. Map 2 displays these priorities in a color code; red is priority 1, orange is priority 2, yellow is priority 3, and green is priority 4.



Map 2: Road Priorities

### **Cass County Highways: Current Status of Paved Highways**

Cass County currently maintains approximately 375 miles of paved highways along the rural portions of the county. These highways vary in age and building materials (See appendix 2 for pavement age), and will deteriorate at varying rates due to these factors. To determine their condition, county roads are

inspected every 5 years by an independent testing consultant using a “Falling Weight Deflectometer” and given a PCI (Pavement Condition Index) rating from the results of this test. These results are used by county engineers help shape decisions for future roadway maintenance/rebuilding. The most recent PCI survey was completed in 2007 and results are shown in Appendix 3. Additionally, seal coats are applied to asphalt highways 2 years after paving or overlaying has been completed to increase the life of the pavement to 15-20 years. A map showing the most recent seal coat for each highway is shown in appendix 4.

### **Cass County Highways: Current Status of Gravel Highways**

Cass County currently maintains approximately 320 miles of gravel highways within the rural portions of the county. These highways vary in age, and some have been widened for future paving. Currently, the roads are maintained with weekly or bi-weekly grading depending on usage. Additionally, a budget for road repairs is prepared every year and additional gravel is added to roads requiring repairs with the allotted funds on a priority system of damage and usage. A more uniform plan for the gravel roads has been adopted for the future, where a general standard of 28’ road tops with a 4% crown grade will be used for future gravel grading and reshaping projects. In addition to these dimensional standards, areas with weak subgrade are retrofitted with drain tile to remove excess moisture from the subgrade or cement reinforcement sections to increase the structural capacity of the road top. We also reshape gravel roads that have become widened or flatter over time from traffic. Reshaping returns the roadway back to its designed width and crown.

### **Bridge Maintenance and Construction**

Cass County maintains approximately 500 structures of which 268 span a distance of 20 feet in length or greater. Inevitably these bridges will deteriorate over time. Maintenance, reconstruction, replacement, and removal needs to and does occur. ND DOT conducts bi-annual inspections of all structures greater than 20 feet in length giving County officials an accurate inventory of existing bridge conditions. This inventory is used to conduct planning for the most effective projects on bridges most in need. The inventory also includes structures that have been identified by inspectors with a “Code 3” status meaning that immediate attention is required.





### *Cass County Bridges: Current Status of 20 foot or longer Bridges on County Highways*

Appendix 5 shows bridges of 20 feet or longer on County Highways. On average, these bridges are in fair condition. 7 bridges are posted for loads of 34 tons & below. These are priorities for replacing, modifying to increase load capacity or testing to verify an increase in load capacity. The North Dakota Department of Transportation inspects these bridges on a 2 year cycle & rates each on a 0-100 scale. When this sufficiency rating falls below 50, the bridge is eligible for Federal funding. Currently, there are no bridges on County Highways that are below 50. There are 5 bridges in the 50-58 range. These would be potential sites for replacement in the near future as their rating falls below 50.

### *Cass County Bridges: Current Status of 20 foot or longer Bridges on Township Roads*

Appendix 6 shows bridges of 20 feet or longer on township highways. These structures vary in condition from poor and in need of replacement to very good. There are approximately 20 bridges with a sufficiency rating below 50. Several of these have a Code 3 rating which requires priority attention. These bridges are replaced or repaired on a priority basis with input from the township officials. Many of these bridges have been damaged during the floods of 2009-2011 and thus have been a priority for repair.

### *Cass County Bridges: Current Status of Bridges less than 20 feet in Length*

There are many minor structures that are less than 20 feet in length. The NDDOT no longer inspects these bridges. The Cass County Highway Department is in the process of developing a 5 year rotation for inspecting these structures. A priority list will be established for repair or replacement. A map showing locations of these structures is being developed.

### *2013-2017 Paved Highway Improvement Plan*

There are numerous factors that can be and are used to make decisions regarding improvements and maintenance on the County Highway System. Many variables go into prioritizing future projects such as average daily traffic as obtained from ND DOT and/or the Fargo Moorhead Metropolitan Council of Governments, PCI ratings, asphalt thickness, last year paved, last year sealed, population within the proximity, and points of commerce or increased traffic. These variables are taken into consideration when scheduling the most efficient construction schedules in upcoming years. Table 4 illustrates the proposed highway projects for the next five years that are a result of these components.

Table 4 - Proposed Paved Highway Improvements

Hwy	Project Location	Type of Project	Year to be Completed*	Funding Source (Local/Fed Aid)	Project Cost
4	C11 to C81	Bituminous Surfacing	2013	Local	\$3,710,000
15	Through Kindred	Grading & Surfacing	2013	Local	\$1,800,000
81	C20 North 0.4 Miles	Bituminous Overlay	2014	Local	\$116,800
20	C17 to I29	Bituminous Overlay	2014	Local	\$475,600
20	I29 to Unversity Dr (Fargo)	Bituminous Overlay and Add Turnlanes	2014	Local	\$1,000,000
31	C22 to C20	Bituminous Overlay	2014	Local	\$1,085,904
9	I94 to Durbin	Bituminous Overlay	2014	Local	\$900,000
22	C11 to Prosper	Bituminous Overlay	2014	Local	\$448,000
28	Main Ave (West Fargo) to 1.4 Miles South & East	Bituminous Overlay	2014	Local	\$280,000
21	C14 to C16	Bituminous Overlay	2014	Local	\$448,000
14	I29 to C81	Bituminous Overlay	2014	Federal	\$107,981
19	12th Ave N to Main Ave (West Fargo)	Bituminous Overlay	2014	Local	\$201,072
81	64th Ave S (Fargo City Limits) to C16 West	Bituminous Overlay	2014	Federal	\$324,690
7	I94 to C6	Bituminous Overlay	2015	Local	\$1,380,000
1	I94 to C32	Bituminous Overlay	2015	Local	\$860,000
6	C38 to C5	Bituminous Overlay	2015	Local	\$2,000,000
5	C4 to C34	Bituminous Overlay	2015	Local	\$848,000
10	C19 to City of Fargo Limts (12th Ave N.)	Grading & Concrete Surfacing	2015	Local	\$1,000,000
3	Ayr to C4	Bituminous Overlay	2016	Federal	\$29,200
4	C3 to C5 North	Bituminous Overlay	2016	Federal	\$29,200
20	C17 to 2 Miles West	Bituminous Overlay	2016	Local	\$584,000
38	I94 to C6 East	Grading	2016	Local	\$4,830,000
38	I94 to C6 East	Bituminous Overlay	2017	Local	\$4,830,000
15	I94 to C10	Grading	2017	Local	\$560,000

\*Note: Years to be completed are illustrative and subject to change and approved annually and/or as necessary by Road Advisory Committee



## 2013-2017 Gravel Road Improvement Plan

Many factors are used to make decisions regarding improvements and maintenance of our gravel road system. Routine maintenance, motor grader operations, and annual gravelling programs are sufficient in maintaining a consistent, high quality gravel road. However, there are times where excessive moisture, poor drainage, soft subgrade, and other issues must be addressed. In addition, there are times when major reshaping or re-grading of gravel roads must occur. Cass County is also proactively working to reduce soft roadbeds through drain tile and subgrade repair/cement stabilization. We will work significant soft spots and subgrade issues through near term drain tile and subgrade repair projects. Long term we will work to reshape gravel roads that have become widened or flattened over time from traffic. We will reshape up to 15 miles of gravel road annually. This reshaping will save money over time by reducing the width of the roadway back to County design standards, which in turn reduces the overall gravel required to resurface the roadway.

Hwy	Project Location	Type of Project	Year to be Completed*	Funding Source (Local/Fed Aid)	Project Cost
None	None	Drain Tile	2013	Local	\$0
UNK	To Be Determined	Drain Tile	2014	Local	\$500,000
UNK	To Be Determined	Drain Tile	2015	Local	\$500,000
UNK	To Be Determined	Drain Tile	2016	Local	\$500,000
UNK	To Be Determined	Drain Tile	2017	Local	\$500,000
10	Buffalo to C5	Subgrade Repair	2013	Local	\$1,200,000
UNK	To Be Determined	Subgrade Repair	2014	Local	\$300,000
UNK	To Be Determined	Subgrade Repair	2015	Local	\$300,000
UNK	If Needed	Subgrade Repair	2016	Local	\$300,000
UNK	If Needed	Subgrade Repair	2017	Local	\$300,000
20	Various Locations C11 to RR Xing	Reshaping	2012	Local	\$100,000
UNK	To Be Determined	Reshaping	2013	Local	\$100,000
UNK	To Be Determined	Reshaping	2014	Local	\$100,000
UNK	To Be Determined	Reshaping	2015	Local	\$100,000
UNK	To Be Determined	Reshaping	2016	Local	\$100,000
UNK	To Be Determined	Reshaping	2017	Local	\$100,000

\*Note: Years to be completed are illustrative and subject to change and approved annually and/or as necessary by Road Advisory Committee

## 2013-2017 Bridge Improvement Plan

The County utilizes bi-annual inspection reports provided by the North Dakota Department of Transportation to identify necessary improvements to County and township structures. \$1,000,000 is allocated annually to account for these necessary improvements. In addition to these improvements the County includes in the construction schedule necessary flood repairs which combine local and federal funds. There are approximately 30 bridges currently slated for improvements. Table 6 illustrates the proposed bridge improvements for 2013-2017.

<i>Table 6 - Proposed Bridge Improvements</i>					
Hwy/Twp	Project Location	Type of Project	Year to be Completed*	Funding Source (Local/Fed Aid)	Project Cost
Pleasant	10/11 Pleasant Twp	Bridge Repair	2013	Local	\$75,000
34	15/22 Gunkel Twp	Bridge Replacement	2013	Local	\$400,000
Reed/Harwood	5 Reed/32 Harwood Twp's	Bridge Replacement	2013	Local	\$350,000
Everest/Durbin	25 Everest/30 Durbin Twp's	Bridge Repair	2013	Local	\$150,000
Durbin	10 Durbin Twp	Bridge Repair	2013	Local	\$75,000
					\$1,050,000
Hill	15/16 Hill Twp	Bridge Replacement	2014	Local	\$150,000
32	35 Cornell/3 Tower Twp's	Bridge Replacement	2014	Local	\$250,000
Gill/Everest	12 Gill/7 Everest Twp's	Bridge Replacement	2014	Local	\$150,000
15	8/9 Mapleton Twp on Drain 14	Bridge Replacement	2014	Local	\$500,000
					\$1,050,000
Empire	28/33 Empire Twp	Bridge Replacement	2015	Local	\$300,000
32	27/28 Amenia Twp	Bridge Replacement	2015	Local	\$700,000
Highland	31/32 Highland Twp	Bridge Replacement	2016	Local	\$150,000
36	1/2 Normanna Twp	Bridge Replacement	2016	Local	\$700,000
Hill	5/8 Hill Two	Bridge Replacement	2016	Local	\$150,000
					\$1,000,000
Hill/Clifton	33 Hill/4 Clifton Twps	Bridge Replacement	2017	Local	\$500,000
					\$500,000

\*Note: Years to be completed are illustrative and subject to change and approved annually and/or as necessary by Road Advisory Committee



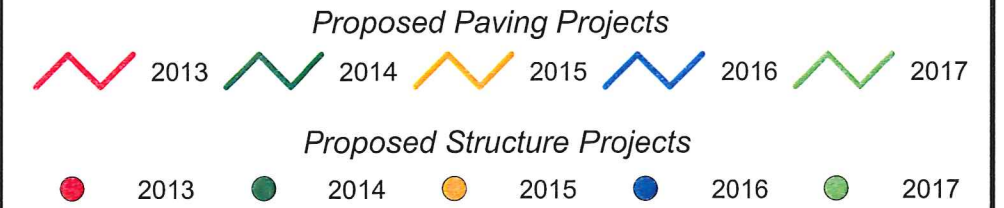
### 2013-2017 Revenues vs Project Costs

Table 7 illustrates the revenue stream and estimated costs of the 2013-2017 Plan. Appendix 1 illustrates the proposed capital improvements over the 2013-2017 time period.

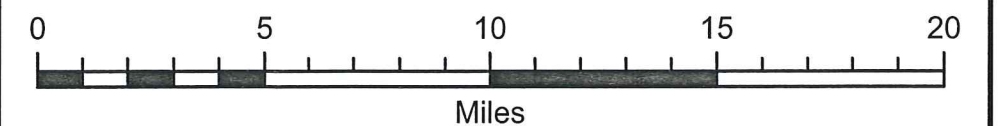
<i>Table 7 - Revenue vs. Project Costs</i>					
Revenue Description	2013	2014	2015	2016	2017
Property Tax	\$4,287,621	\$4,373,373	\$4,460,841	\$4,550,058	\$4,641,059
Highway Distribution Tax	\$6,309,047	\$6,435,228	\$6,563,932	\$6,695,211	\$6,829,115
Other	\$151,863	\$154,900	\$157,998	\$161,158	\$164,381
<b>Total Revenues</b>	<b>\$10,748,531</b>	<b>\$10,963,502</b>	<b>\$11,182,772</b>	<b>\$11,406,427</b>	<b>\$11,634,556</b>
Federal Aid Highway Funding	\$1,220,000	\$1,220,000	\$1,220,000	\$1,220,000	\$1,220,000
Total Revenues & Federal Aid	\$11,968,531	\$12,183,502	\$12,402,772	\$12,626,427	\$12,854,556
Total Operating Cost (not including Road/Bridge Projects)	\$3,579,261	\$3,650,846	\$3,723,863	\$3,798,340	\$3,874,307
<b>Total Available for Road/Bridge Projects</b>	<b>\$8,389,270</b>	<b>\$8,532,656</b>	<b>\$8,678,909</b>	<b>\$8,828,087</b>	<b>\$8,980,249</b>
Total Paved Highway Project Costs	\$5,510,000	\$5,388,047	\$6,088,000	\$5,735,200	\$5,390,000
Total Gravel Highway Costs	\$1,200,000	\$800,000	\$800,000	\$800,000	\$800,000
County Bridge Project Costs	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000
Chipseal, Crackseal, & Striping	\$625,000	\$1,225,000	\$575,000	\$1,325,000	\$1,025,000
<b>Total Project Costs</b>	<b>\$8,335,000</b>	<b>\$8,413,047</b>	<b>\$8,463,000</b>	<b>\$8,860,200</b>	<b>\$8,215,000</b>
<b>Differences (Revenues-Costs)</b>	<b>\$54,270</b>	<b>\$119,609</b>	<b>\$215,909</b>	<b>(\$32,113)</b>	<b>\$765,249</b>



# Cass County Highway Department 2013-2017 Five-Year Capital Improvement Plan



Hwy	Project Location	Type of Project	Year to be Completed*	Funding Source (Local/Fed Aid)	Project Cost
4	C11 to Drain 13	Bituminous Surfacing	2013	Local	\$3,710,000
15	Through Kindred	Grading & Concrete Surfacing	2013	Local	\$1,800,000
81	C20 North 0.4 Miles	Bituminous Overlay	2014	Local	\$116,800
20	C17 to I29	Bituminous Overlay	2014	Local	\$475,600
20	I29 to University Dr (Fargo)	Bituminous Overlay and Add Tumlans	2014	Local	\$1,000,000
31	C22 to C20	Bituminous Overlay	2014	Local	\$1,085,904
9	I94 to Durbin	Bituminous Overlay	2014	Local	\$900,000
22	C11 to Prosper	Bituminous Overlay	2014	Local	\$448,000
28	Main Ave (West Fargo) to 1.4 Miles South & East	Bituminous Overlay	2014	Local	\$280,000
21	C14 to C16	Bituminous Overlay	2014	Local	\$448,000
14	I29 to C81	Bituminous Overlay	2014	Federal	\$107,981
19	12th Ave N to Main Ave (West Fargo)	Bituminous Overlay	2014	Local	\$201,072
81	64th Ave S (Fargo City Limits) to C16 West	Bituminous Overlay	2014	Federal	\$324,690
10	C19 to City of Fargo Limits (12th Ave N.)	Grading & Concrete Surfacing	2015	Local	\$1,000,000
7	I94 to C6	Bituminous Overlay	2015	Local	\$1,380,000
1	I94 to C32	Bituminous Overlay	2015	Local	\$860,000
6	C38 to C5	Bituminous Overlay	2015	Local	\$2,000,000
5	C4 to C34	Bituminous Overlay	2015	Local	\$848,000
38	I94 to C6 East	Grading	2016	Local	\$4,830,000
3	Ayr to C4	Bituminous Overlay	2016	Federal	\$29,200
4	C3 to C5 North	Bituminous Overlay	2016	Federal	29,200
20	C17 to 2 Miles West	Bituminous Overlay	2016	Local	\$584,000
15	I94 to C10	Grading	2017	Local	\$560,000
38	I94 to C6 East	Bituminous Surfacing	2017	Local	\$4,830,000



Jason Benson  
County Engineer, P.E.

Richard Sieg  
Highway Superintendent

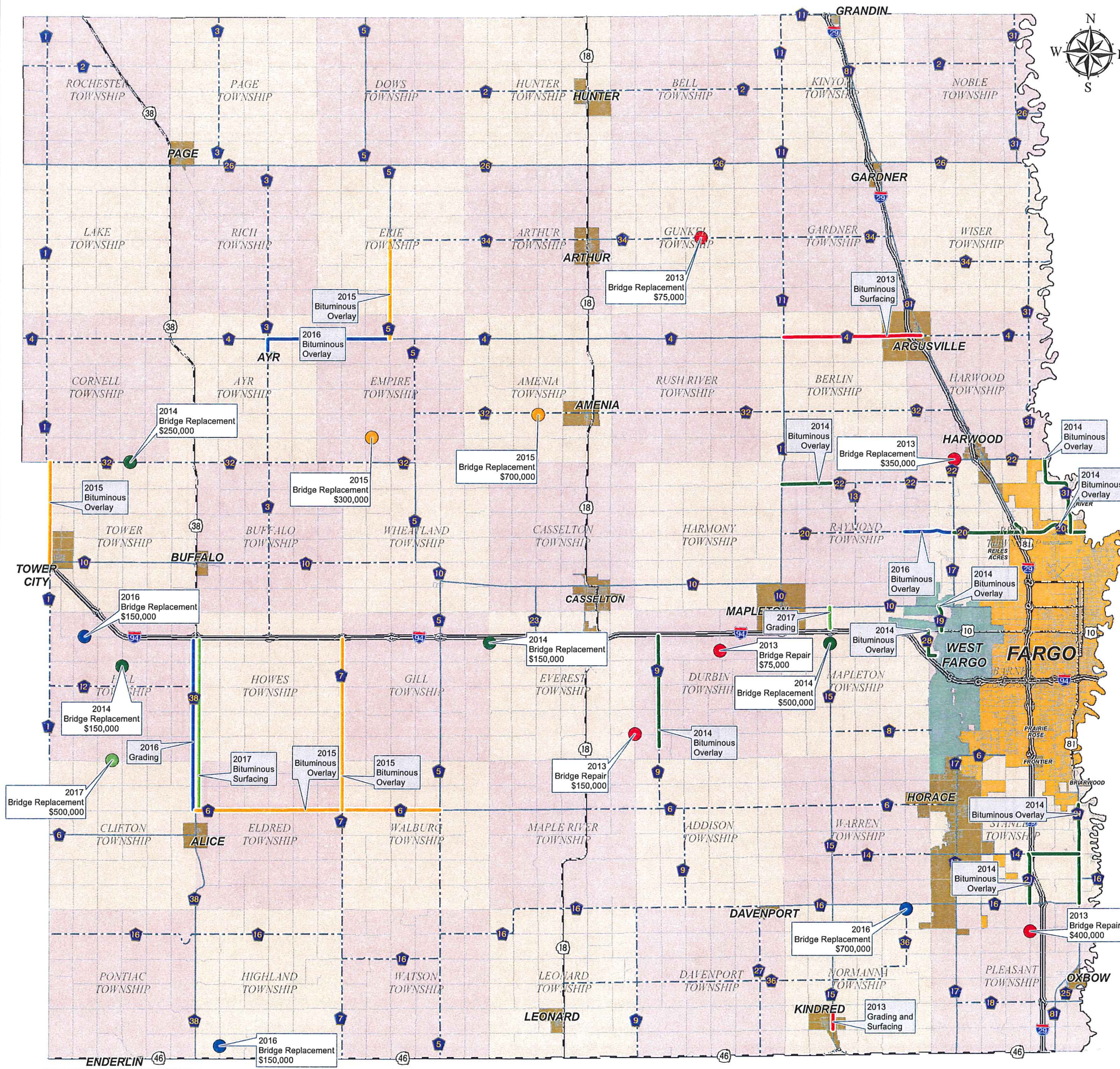
DATE: July, 2012



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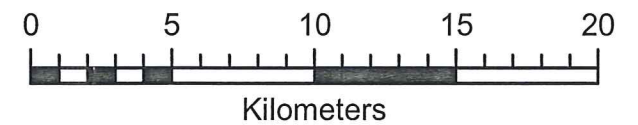
# Cass County Highway Department Pavement Condition Index (PCI) \*

- Poor
- Fair
- Good
- Very Good
- Excellent
- Gravel

\* based on Braun Intertec PCI Scale

	Poor 0-40	Fair 41-55	Good 56-70	Very Good 71-85	Excellent 86-100
<b>Miles</b>	0	0	26	101	248
<b>Average PCI</b>	0	0	60.9	77.9	95.96
<b>High PCI</b>	0	0	70	85	100
<b>Low PCI</b>	0	0	56	71	86

\*Pavement Evaluation completed by Braun Intertec Corporation in 2007. The evaluation consisted of deflection testing with a Model 8000E Cynatest Falling Weight Deflectometer. Pavement surface condition assessment based on the Pavement Condition Index (PCI) method developed by the Army Corps of Engineers. The resulting data is analyzed to evaluate the structural and surface condition of the existing pavements on the tested road segments.



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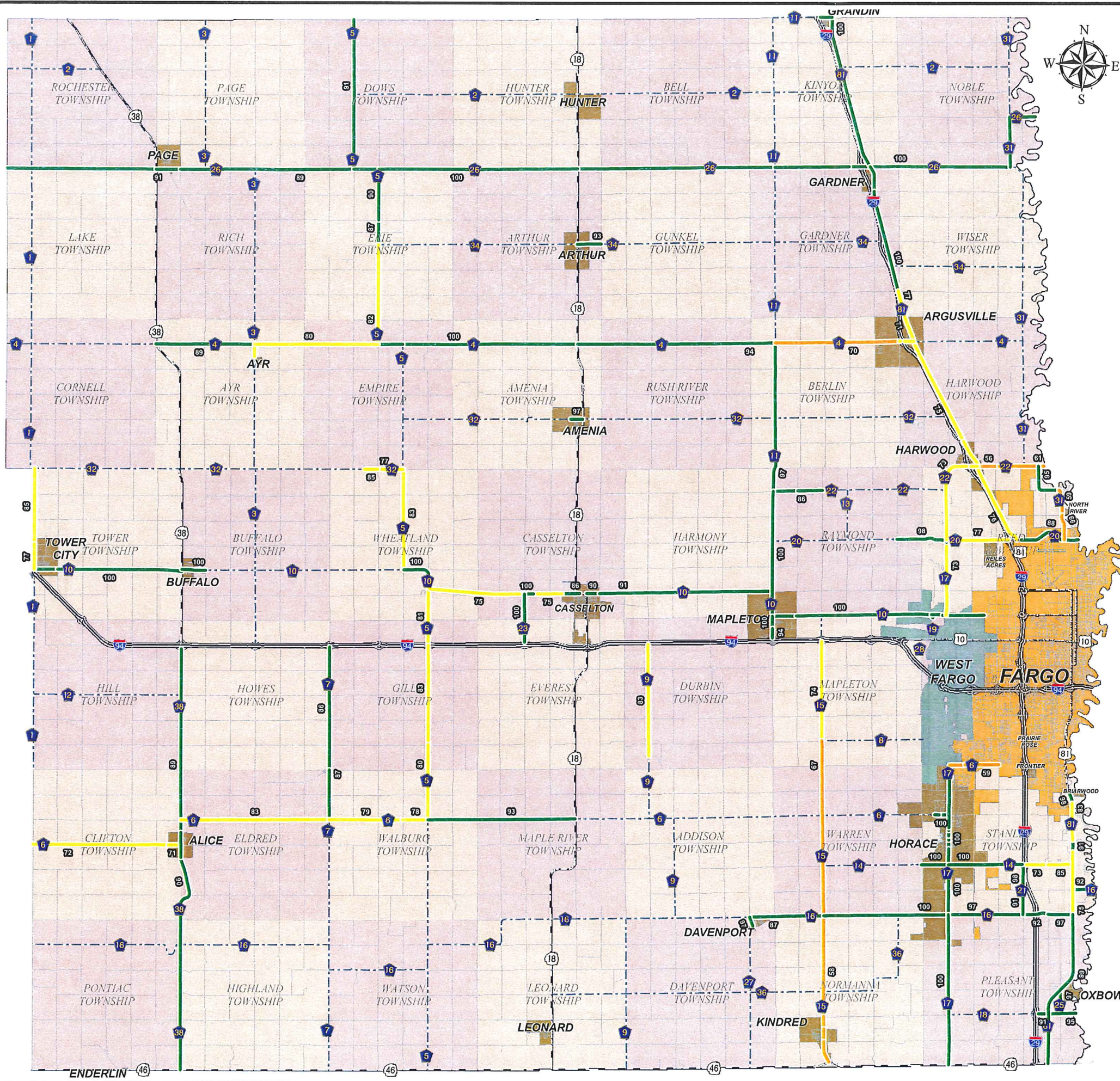
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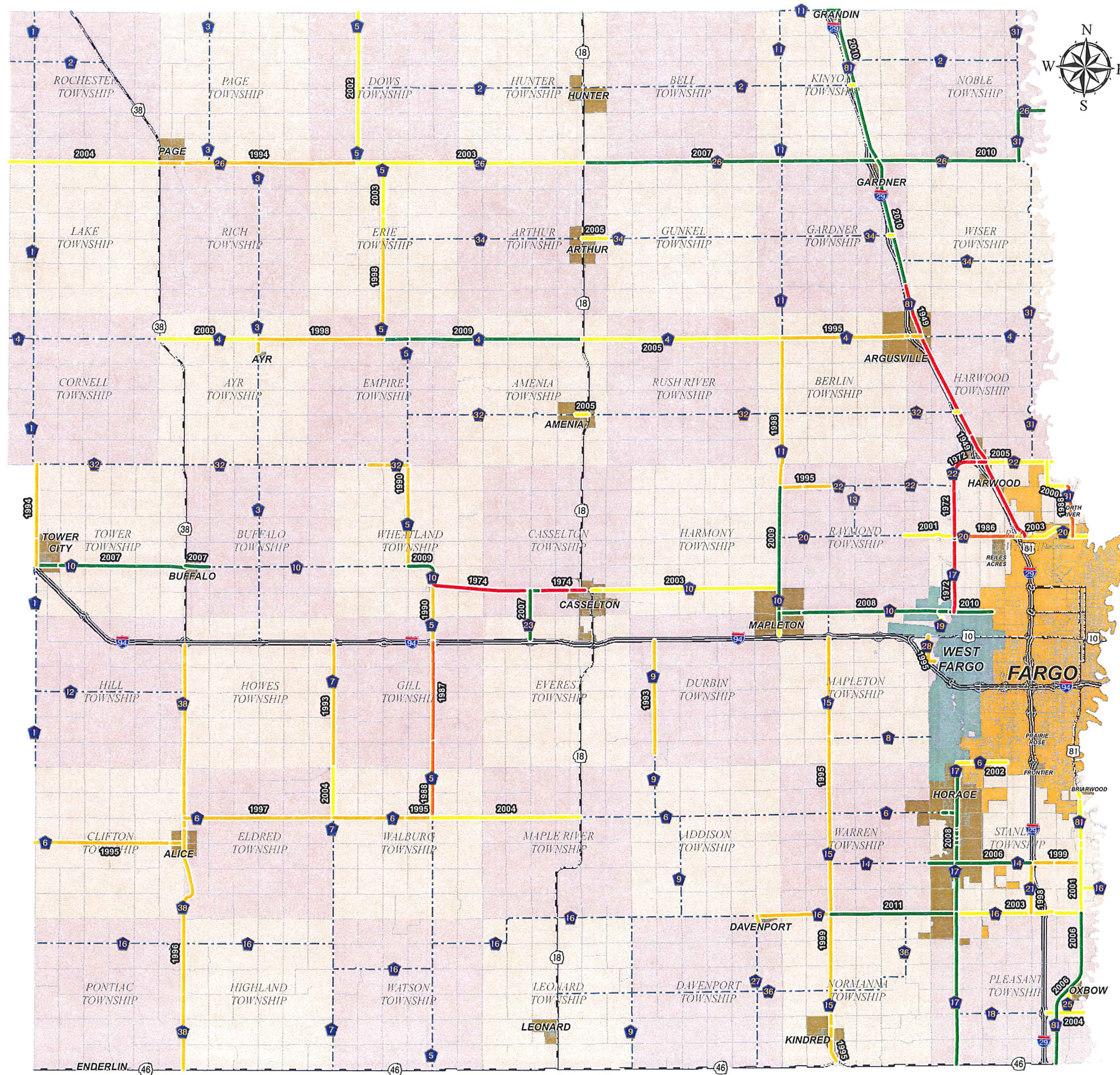
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# Cass County Highway Department Paving Projects

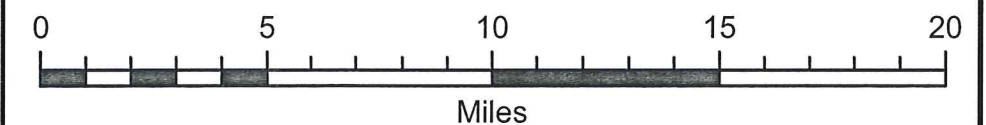
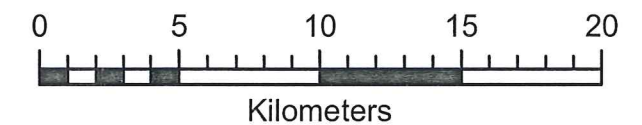


## Year of Last Paving Project

- 1949 - 1979
- 1980 - 1989
- 1990 - 1999
- 2000 - 2005
- 2006 - 2011
- - - Gravel

	1949-1979	1980-1989	1990-1999	2000-2005	2006-2011
Miles	37	11.55	113	96	135
Average PCI *	75.6	73	76.1	71.81	99.98

\*Pavement Evaluation completed by Braun Intertec Corporation in 2007. The evaluation consisted of deflection testing with a Model 8000E Cynatest Falling Weight Deflectometer. Pavement surface condition assessment based on the Pavement Condition Index (PCI) method developed by the Army Corps of Engineers. The resulting data is analyzed to evaluate the structural and surface condition of the existing pavements on the tested road segments.



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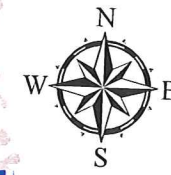
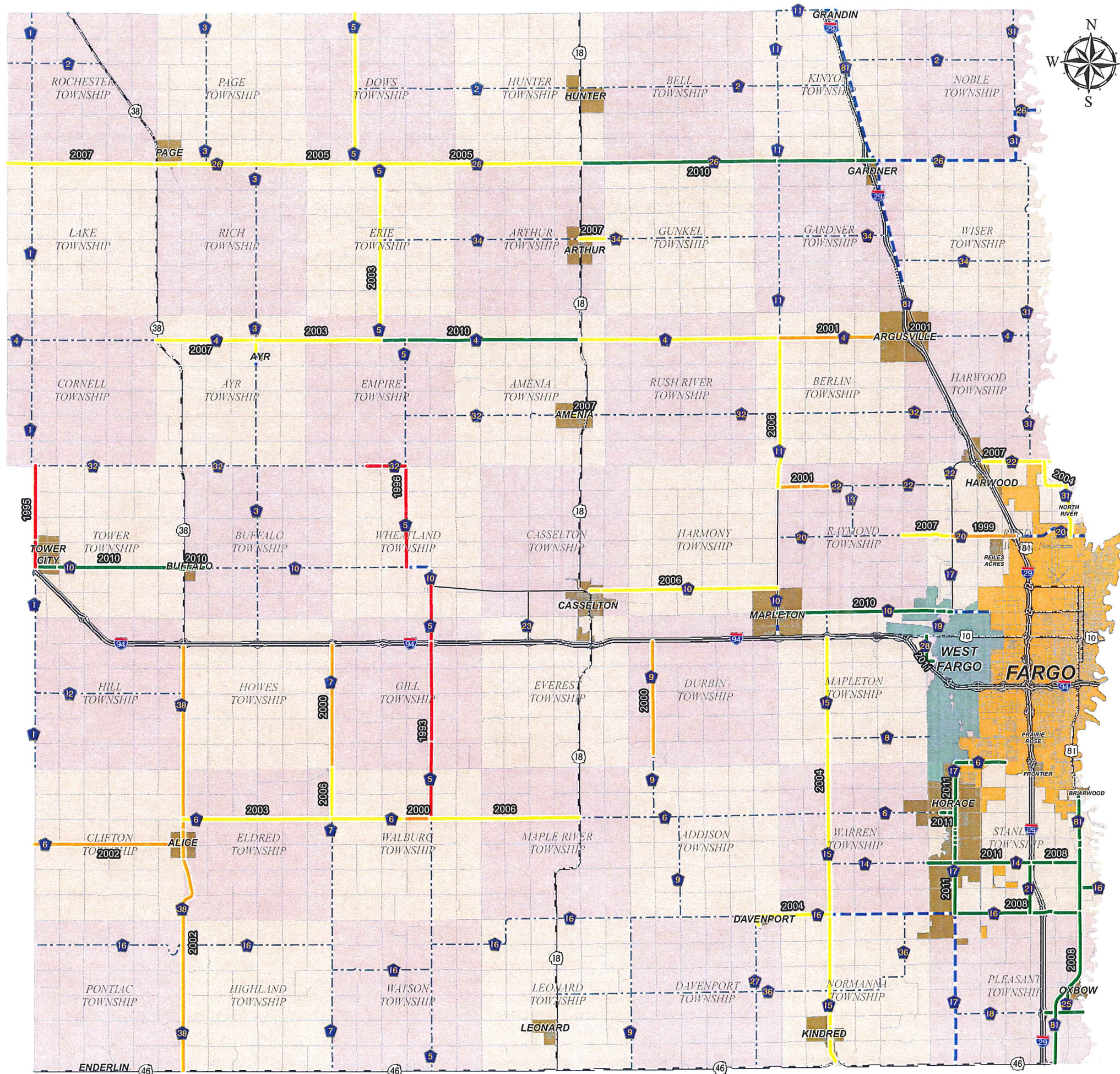
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# Cass County Highway Department Seal Coat Projects

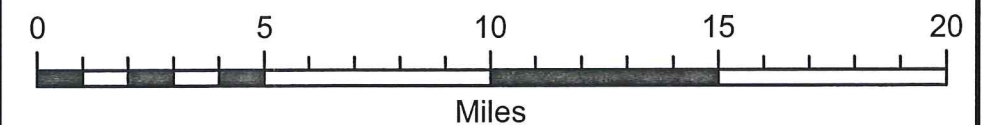
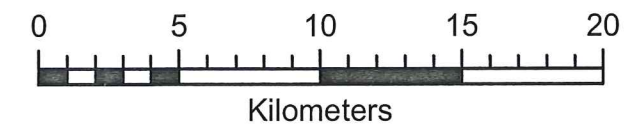


## Year of Last Seal Coating

- 1993 - 1998
- 1999 - 2002
- 2003 - 2007
- 2008 - 2011
- - - Asphalt - No Seal Coat
- Concrete Surface
- · · Gravel

Category	Miles	Average PCI *
1993-1998	20	83
1999-2002	43	81
2003-2007	126	83
2008-2011	93	92
Asphalt - No Seal Coat	38	71
Concrete Surface	56	83

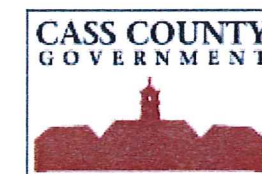
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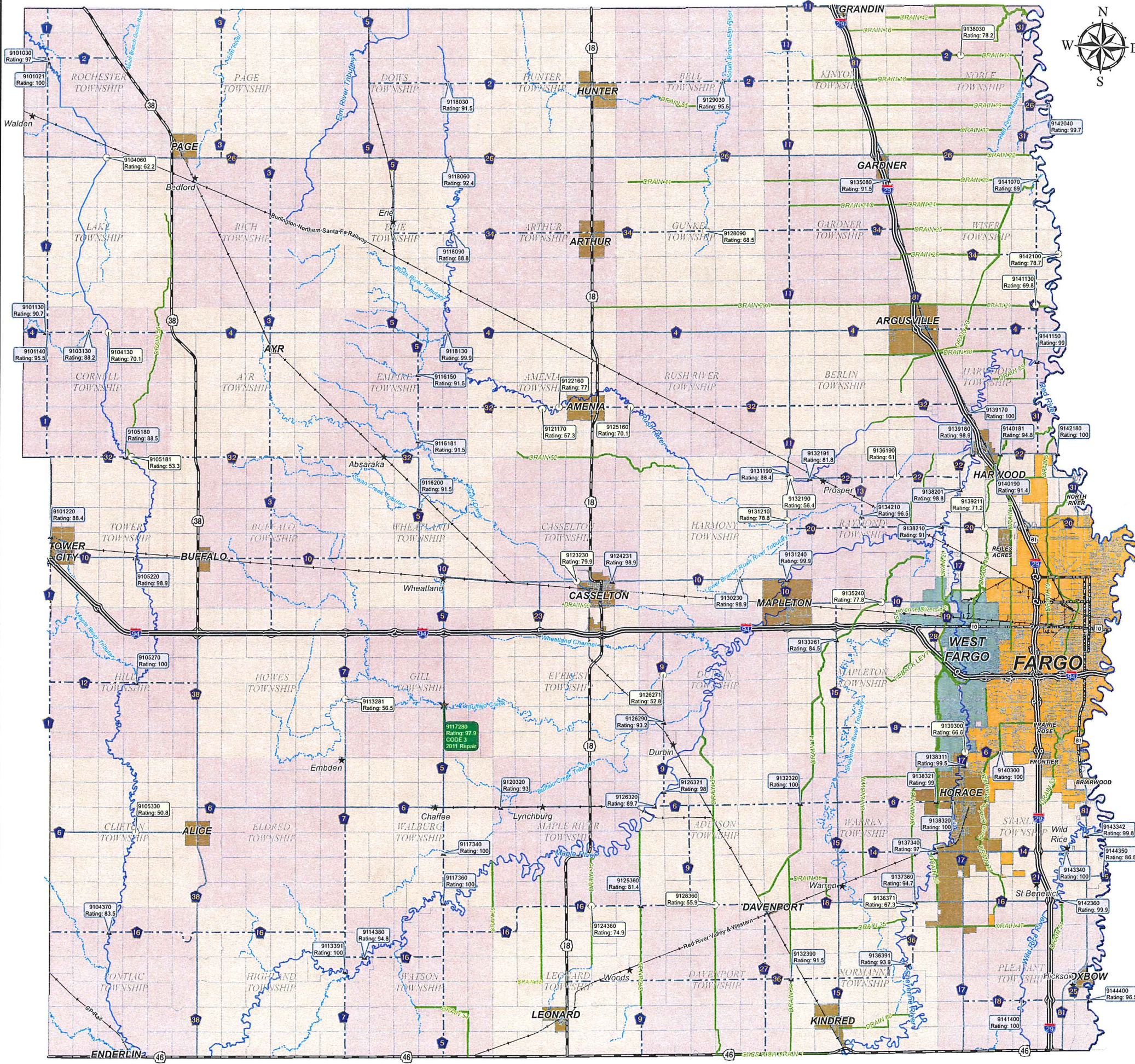
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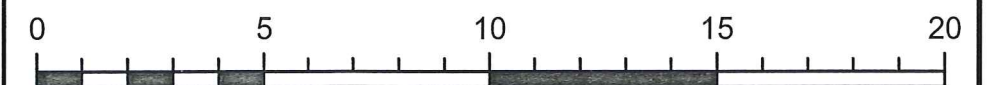
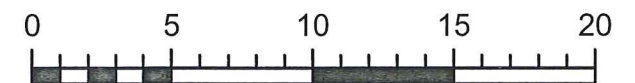
ND DOT 2009/2010  
 Bridge Inspection & Appraisal  
 Bridges on County Roads



## Bridge Sufficiency Rating Categories

- ▲ 80 + Sufficiency
- ▲ 50-79.9 Sufficiency
- ▲ 0-49.9 Sufficiency
- ★ Code Three Structure

	80+	50-79.9	0-49.9	Code 3
<b>Total</b>	61	22	0	1
<b>Average</b>	94.8	66.72	N/A	67.3
<b>Low</b>	81.4	50.8	N/A	N/A
<b>High</b>	100	79.9	N/A	N/A



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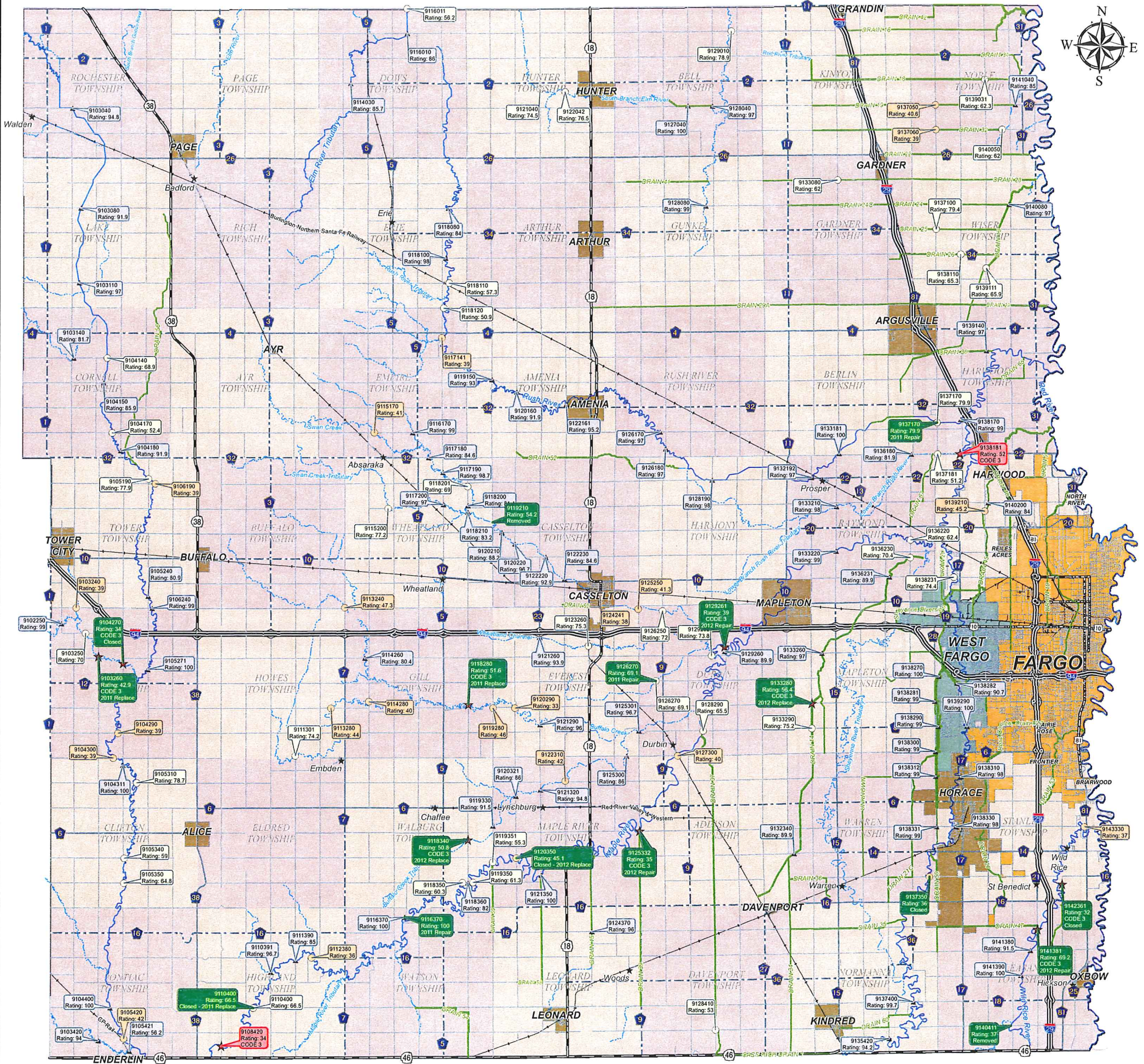
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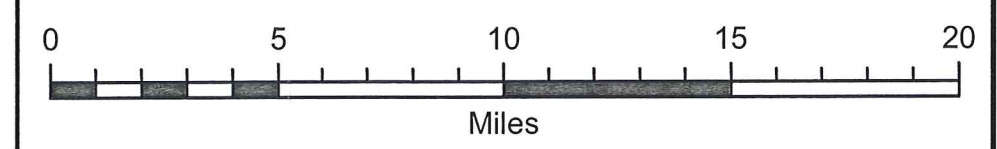
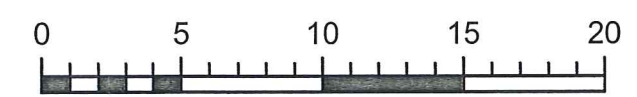
ND DOT 2009/2010  
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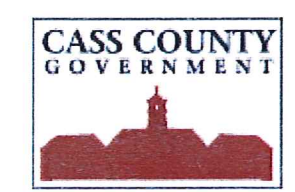
### Bridge Sufficiency Rating Categories

- ▲ 80 + Sufficiency
- ▲ 50-79.9 Sufficiency
- ▲ 0-49.9 Sufficiency
- ★ Code Three Structure

	80+	50-79.9	0-49.9	Code 3
<b>Total</b>	79	38	23	11
<b>Average</b>	93.7	67	40.4	45.2
<b>Low</b>	80.4	50.9	33	32
<b>High</b>	100	79.9	47.3	69.2



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