

ROADWAY RECONSTRUCTION/REHABILITATION

Southside Street Improvement District 213
Project 2018-07



**CITY OF
MANDAN**

"WHERE THE WEST BEGINS"

Prepared by

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SOUTHSIDE STREET IMPROVEMENT DISTRICT 213 PROJECT 2018-07

Mandan, North Dakota

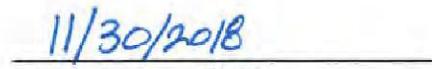
CERTIFICATION

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the State of North Dakota. This document was originally issued and sealed by Joshua J. Reiner, Registration number PE-10616 on 11/30/2018 and the original document is stored at Moore Engineering, Inc., Minot, N.D.





Joshua J. Reiner, P.E.



Date

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Executive Summary

A. Project Description

City: City of Mandan, North Dakota
Project: City of Mandan Southside Street Improvement District 213
Limits: See attached Exhibit 1

B. Project Schedule

Project: City of Mandan Southside Street Improvement District 213
Plans Complete: January 2019
Bid Opening: March 2019

C. Purpose of Project

The Southside Neighborhood is an approximately 67 block area situated in the southwest corner of Mandan, tucked in between the natural borders of the Heart River, Mandan Municipal Golf Course, railroad corridor and the park property giving it a small neighborhood feel. There is more than adequate green space with nearly 1/3 of the area covered by the golf course, little league fields, tennis courts, track stadium, softball complexes and river bottom lowlands. Centered in the middle of the small older neighborhood with very mature trees is the Mary Stark Elementary School. The elementary school, only 6 blocks from the far extent of the neighborhood makes this a walkable neighborhood.

Being an older neighborhood, the City of Mandan has identified this as an area in need of improvements and has commissioned this study to identify the existing deficiencies, recommendations for addressing deficiencies and costs associated with the improvements. Similarly to what Mandan has done in the past, neighborhoods are evaluated as a whole, as it is more efficient and cost effective to properly plan the improvements through detailed studies and then address all of the deficiencies in a single coordinated project. This report will focus on asphalt pavement rehabilitation of the streets and alleys; however, in addition, several other systems such as curb and gutter, sidewalks, water mains, sanitary sewer mains, and storm sewer were considered.

The driving factor for prioritizing this neighborhood is the severely deteriorated asphalt pavement conditions and the primary purpose of the project will be to rehabilitate the existing roadways. The intention will be to provide recommendations for an improvement project that will achieve a 20 year design life of the roadways, with proper maintenance. Through careful evaluations of surface conditions, geotechnical evaluations of subsurface conditions, assessments have been made and varying treatments recommended from more minor asphalt milling and overlay work to more major full pavement reconstruction work. With the street improvements several upgrades to sidewalks and installation of corner ramps in intersections will need to be installed as required by the American Disability Act (ADA).

Curb and gutter replacement may be done in areas in order to promote drainage and reduce the amount of water that sits in the gutter flow lines. Additionally the project considers storm sewer improvements to reduce the impact of the larger runoff events on properties which are currently more susceptible to localized flooding. This will in turn improve the efficiency of getting the storm water off of the streets extending the life of the pavements. The storm

sewer system design shall be based upon the Technical Memorandum, South Side Mandan Memorial Park Watershed – Problem Site Q provided by the City of Mandan.

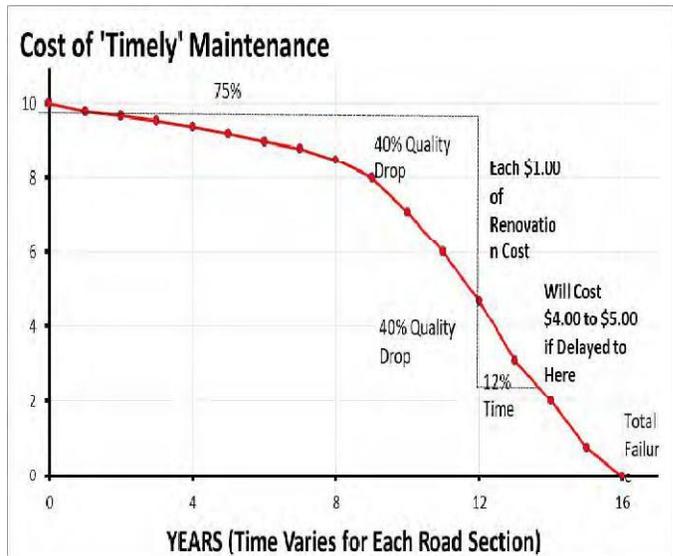
Existing water main infrastructure has been evaluated by the City of Mandan Public Works Department. Approximately 10 blocks of deteriorated water main were identified within the project area which need to be addressed. In addition, there are 3 properties along 7th Street SW east of 8th Avenue SW which currently do not have access to sanitary sewer mains.

While the city is planning the neighborhood street improvements, the Mandan Parks and Recreation District (Park District) has a master plan for improvements to their facilities within the project area. The intention has been to coordinate a joint improvement project with both the City and Park District. Combining the Park District's 3 parking lots with the City's street improvements will assist by making it a more attractive project to bidders and help spread out mobilization and bonding costs with the hope of achieving lower construction pricing for the improvements.

D. Need for Project

Existing Conditions: The majority of the streets within the neighborhood are comprised of asphalt pavement, with several isolated blocks of gravel streets and one concrete street. Due to limited records, it is uncertain when the asphalt pavements were installed, but it is believed that it has been over 25 years since the last major improvement project within the area. Since original construction of the street in the neighborhood the City's public works department has completed maintenance such as patching, sealcoating and crack sealing.

Asphalt pavement generally has a finite life expectancy and deteriorates over time. We expect pavements to move as temperatures rise and fall (expand and contract), crack (transverse, longitudinal, block and alligator) in specific ways at certain ages, and deteriorate at differing rates according to factors such as adequacy of drainage, underlying moisture conditions, thickness (proper design strength), pavement loadings and timeliness of maintenance. It is generally assumed that the life expectancy of an asphalt pavement roadway is around 20 years if constructed properly and timely maintenance is performed. To the right is a graph that explains the relationship between pavement deterioration and time.



Cores were drilled through the existing street section (24" deep) in 45 locations to investigate the pavement thicknesses, underlying aggregate base thicknesses and subgrade soil conditions. A wide range of results were encountered from 2" of asphalt pavement to more than 7" of asphalt pavement on varying depths of base material. These results are shown in the table in the attached Geotechnical Evaluation Report Prepared by Braun Intertec, Corporation. In addition to taking the 45 pavement samples, visual inspections of the streets were made. The pavements were evaluated according to the Pavement Surface Evaluation and Rating (PASER) system, a common system used to rate

and manage pavement conditions originally developed by the Transportation Information System of the University of Wisconsin-Madison.

The condition of the existing approximately 67 blocks of streets and 24 block of asphalt alleys in the project area varies. Several streets have adequate pavement thickness and/or have been repaired more recently and are in fair condition and will require less extensive resurfacing work. However, the majority of the streets are in a much further deteriorated condition and will require more extensive work including full reconstruction.

There are several blocks of streets which currently have gravel surfacing on approximately one half of the roadway due to the Southside Water Improvement Project - Project No. 2017-10 which the city began in 2018 and anticipates completing in the 2019 construction season.

As outlined in the Technical Memorandum, South Side Mandan Memorial Park Watershed – Problem Site Q provided by the City of Mandan several locations exist within the project area which are susceptible to localized flooding during larger runoff events. Installation of the storm sewer proposed in the above referenced Technical Memorandum will help to alleviate drainage deficiencies and the localized flooding.

The Mandan Parks and Recreation District master plan includes improvements to the three existing parking lots in the project area. Including these improvements in the project will help to meet the goals of the Master Plan more economically.

E. Scope of Work

Street Improvements:

The intention is to provide the maximum value and minimize project cost in order to meet the project goal of a 20 year pavement design life. It is important to complete the appropriate type of improvements for example, less expensive treatment options, such as mill and overlay, are not appropriate if the street has deteriorated beyond the point of minor repair. If improperly designed, we risk having excessive pavement failures during construction as the streets won't hold up to the heavy traffic during construction. This would result in high change order costs and more importantly would likely lead to early failure of the pavements shortening the life expectancy of the new pavement.

The scope of work for street improvements throughout the project area includes varying treatments including:

- a. Mill and Overlay W/ Pavement Patching and Curb & Gutter Spot Repairs
- b. Pavement and Base Replacement W/ Curb & Gutter Spot Repairs
- c. Full Reconstruct

See Exhibit 2 for the designation of which type of pavement treatment each street is scheduled for.

See Exhibit 3 for the street sections which the Estimated Construction Costs were based upon.

The scope of the street improvements portion of this project will include installation of pedestrian ramps at intersections within the project area where not already present. These

improvements will be made in accordance the American Disability Act (ADA) and NDDOT Standards.

Alley Improvements:

The intention of the alley improvements is to resurface the alleys which currently have asphalt pavement. Alleys with existing gravel surfacing will not include improvements in this project. The scope of work for the alley improvements as shown in Exhibit 4 includes:

- a. Mill and Overlay W/ Pavement Patching

Park District Parking Lot Improvements:

The Mandan Park District owns three parking lots in the neighborhood of the project. Each of these parking lots along with the access roadways are scheduled to receive varying treatments including:

- a. Mill and Overlay W/ Pavement Patching
- b. Preparation of Existing Gravel Surface and Paving

See Exhibit 5 for the designation of which treatment each parking lot and access roadway is scheduled to receive.

Storm Sewer Improvements:

The scope of the project includes installation of storm sewer as outlined in the Technical Memorandum, South Side Mandan Memorial Park Watershed – Problem Site Q provided by the City of Mandan. Additional storm water modeling was completed in order to determine inlet placement and storm sewer sizing. Appendix C contains a summary of the storm water modeling findings and is intended to supplement the above Technical Memorandum. This summary of the storm water modeling provides an additional block of storm sewer on 3rd Street SW which extends the system from 7th Avenue SW to 8th Avenue SW from what was presented in the above referenced Technical Memorandum. In doing so an additional runoff area of approximately 10 Acres was able to be collected and diverted to the drainage ditch north of 1st Street SW.

Water Main Improvements:

Evaluation of the water main system is being undertaken by City staff separately from the scope of this project. At the time of preparation of this report approximately 10 blocks of water main and associated water services had been determined to be in need of replacement. These improvements however will be coordinated with this project. Costs associated with the water main improvements will not be included in the assessments related to this project.

Sanitary Sewer Improvements:

The existing sanitary sewer system has been evaluated by city staff and was determined to be in acceptable condition. An extension of approximately two (2) blocks of sanitary sewer main on 7th Street NW East of 8th Avenue SW is planned to be done under another project prior to the roadway improvements in this area.

F. Description of Alternatives

1. Alternative A: No Build

This alternative does not meet the goals of the project. A no build alternative does not address the already deteriorated roadway conditions or the drainage issues within the neighborhood. This alternative would result in higher maintenance costs while allowing the roadways to further deteriorate. This will create the possibility of more extensive work being required in the future.

2. Alternative B: Build

This alternative includes roadway improvements as designated in Exhibit 2. The roadways to receive base replacement will be sub-cut and have geotextile reinforcement fabric and gravel base material installed prior to paving operations. The installation of the geotextile reinforcement fabric and the gravel base will provide a stable section to support the new asphalt pavement. The roadways to receive a mill and overlay treatment will be milled down +/- 2" then overlaid with 2" of bituminous pavement. Curb and gutter replacement varies throughout the project. Streets identified to receive Mill and Overlay and Replacement of Pavement will have curb and gutter spot repairs done while streets designated for Full Street Reconstruct will have all of the curb and gutter replaced. ADA ramps will be installed at intersections within the project area where not already present. It is recommended that the street improvements project is bid to include an alternate option of the use of Cement Stabilized Base in lieu of the traditional fabric and gravel base section. This alternate base section can be more economical than traditional gravel base sections and can lead to faster construction timelines.

This alternative includes the Alley improvements as outlined in Exhibit 3.

This alternative includes Mandan Park District Improvements as outlined in Exhibit 4.

This alternative includes installation of Storm Sewer as outlined in the Technical Memorandum, South Side Mandan Memorial Park Watershed – Problem Site Q provided by the City of Mandan and supplemented by Appendix C.

3. Summary of Environmental and Site Issues

Alternative A: No Build

This alternative raises the environmental concern of continued deterioration of the existing roadways. Allowing the existing roadways to continue to deteriorate will lead to further displeasure of the roadway users and possible damage to vehicles.

Additionally due to the lack of existing storm sewer in the project area localized flooding will continue which can cause traffic issues during large runoff events and potential property damage.

Alternative B: Build

This alternative raises environmental concerns from impacts of the construction activities including erosion control, dust, road closures, noise etc. In order to alleviate these concerns provisions need to be put in place in the drawings and specifications for the project. These provisions could include but are not limited to installation of erosion control devices, temporary access, dust control and working hour restrictions.

4. Easements / ROW Issues

All street and sidewalk improvements associated with this project are anticipated to be within already established ROW. However temporary construction easements may be needed to install sidewalks and tie into existing properties.

Portions of the storm sewer improvements associated with this project are anticipated to require easements. The exact need for easements for storm sewer improvements will need to be determined in the final design of the project.

G. Preliminary Estimated Project Costs and Preliminary Special Assessments

Preliminary Estimated Project Costs are summarized in Table 1 below. Detailed project cost estimates for all proposed improvements are included in the Appendices. These project costs are established based upon our past experiences with projects of similar scope however the costs may be susceptible to change in the development of a final design. The costs include estimated construction costs along with indirect costs outlined in the detailed project cost estimates.

Preliminary special assessment rates based upon the Preliminary Estimated Project Costs are shown in Table 2 below. These special assessment rates are developed by using methods summarized below.

Assessment Methodology Summary:

Streets and Alley Improvements:

Interior Lots: Full Front Footage

Corner Lots: ½ of the sum of the Front Footage and Side Yard Footage

Park District Parking Lot Improvements:

All associated costs will be assessed to the Mandan Park District

Storm Sewer Improvements:

Storm Sewer costs will be assessed based on contributing area and a Land Use Coefficient as shown in Table 3 below to the benefitting properties.

Table 1 – Summary of Estimated Costs

Improvement Category	Estimated Construction Cost	Indirect Costs *	Total Cost
Street Improvements	\$4,219,000.00	\$1,266,000.00	\$5,485,000.00
Alley Improvements	\$214,060.00	\$64,940.00	\$279,000.00
Storm Sewer Improvements	\$963,325.00	\$289,675.00	\$1,253,000.00
Total City Project Cost			<u>\$7,017,000.00</u>

Park District Parking Lot Improvements	\$408,180.00	\$122,820.00	\$531,000.00
Total Project Cost			<u>\$7,548,000.00</u>

* Indirect Costs are associated with Project Contingencies, Legal Fees, Engineering Fees, Administration Fees, Etc.

Table 2 – Summary of Preliminary Special Assessment Rates

Improvement Category	Assessment Rate
Street Improvements (\$/FF)	\$188.8979
Alley Improvements (\$/FF)	\$30.2054
Park District Parking Lot Improvements (L.Sum)	\$531,000.00
Storm Sewer Improvements - Commercial Land Use (\$/SF)	\$0.8158
Storm Sewer Improvements - Residential Land Use (\$/SF)	\$0.3359
Storm Sewer Improvements - Parks Land Use (\$/SF)	\$0.0960

Table 3 – Land Use Coefficient

Land Use	Coefficient
Commercial	2.428571429
Residential	1
Parks	0.285714286

H. Public Concerns / Need for Public Input

Table 4 – Summary of Comments

Topic	Comments
Alleys	I would like the alley by my house paved.
Alleys	This past year we poured an alley driveway and would like to make sure the grade is made so the water doesn't drain into our property.
Alleys	Are there going to be aprons on the alleys that are gravel?

Street Lights	Leave current street lights in place.
Alleys	Leave the alleys the way they are now.
Project Cost	We need to keep costs down for the homeowners. This is why we need to leave the street lights that in place alone. Also leave the alleys alone. They are fine the way they are now.
Alleys	Leave the alleys as they are.
Street Lights	Leave the lights (Street) as they are.
Entire Project	There is no need for storm drains in 95% of this area. There is nothing wrong with the street lights. The street just needs to be paved where they re-did the water lines. The road in front of my shop is perfectly fine as gravel. My taxes there are \$400/year. Your proposal is going to add \$6,500/year to my taxes. I bought this property for its low taxes. I can not afford \$6,500 at my shop and another \$1,500 at my house. My neighbors are mostly all on fixed incomes and they too cannot afford these fancy additions. Furthermore my taxes will also go up due to the Park District owns a majority of the property down here. Just leave it as it is and take your fancy ideas elsewhere. I don't want more traffic by my property. I maintain the road by myself and that saves my neighbors money.
General Project Related	Why are the properties by the golf course being left out? Homes by 6th St. SW and 11th Ave SW.
General Project Related	Can the public see/get the maps for reconstruction/rehabilitation for each street?
General Project Related	What do the different colors for the front footage and how will they be assessed?
General Project Related	How were Commercial Properties assessed in District 199 and will they be assessed the same in this district?
General Project Related	How was the estimated light cost associated with the project?
General Project Related	If ADA are a federal requirement why isn't there any Federal Grants to complete this work?
General Project Related	Will there be any impacts to 3rd Street if this project moves forward?
General Project Related	When will the letters be sent out and how long will the protest period be?
General Project Related	How can the citizens protest this project if the Parks and Rec. and the City own most of the properties in the assessment district?
General Project Related	Do the costs per front footage include engineering and administration costs?
General Project Related	If the residents want their alley paved if it is currently gravel, can that happen?
General Project Related	Will the letters that are sent out show the amount of interest that will be accrued over the 20 year period? What is the % that the specials will be assessed at?



Legend

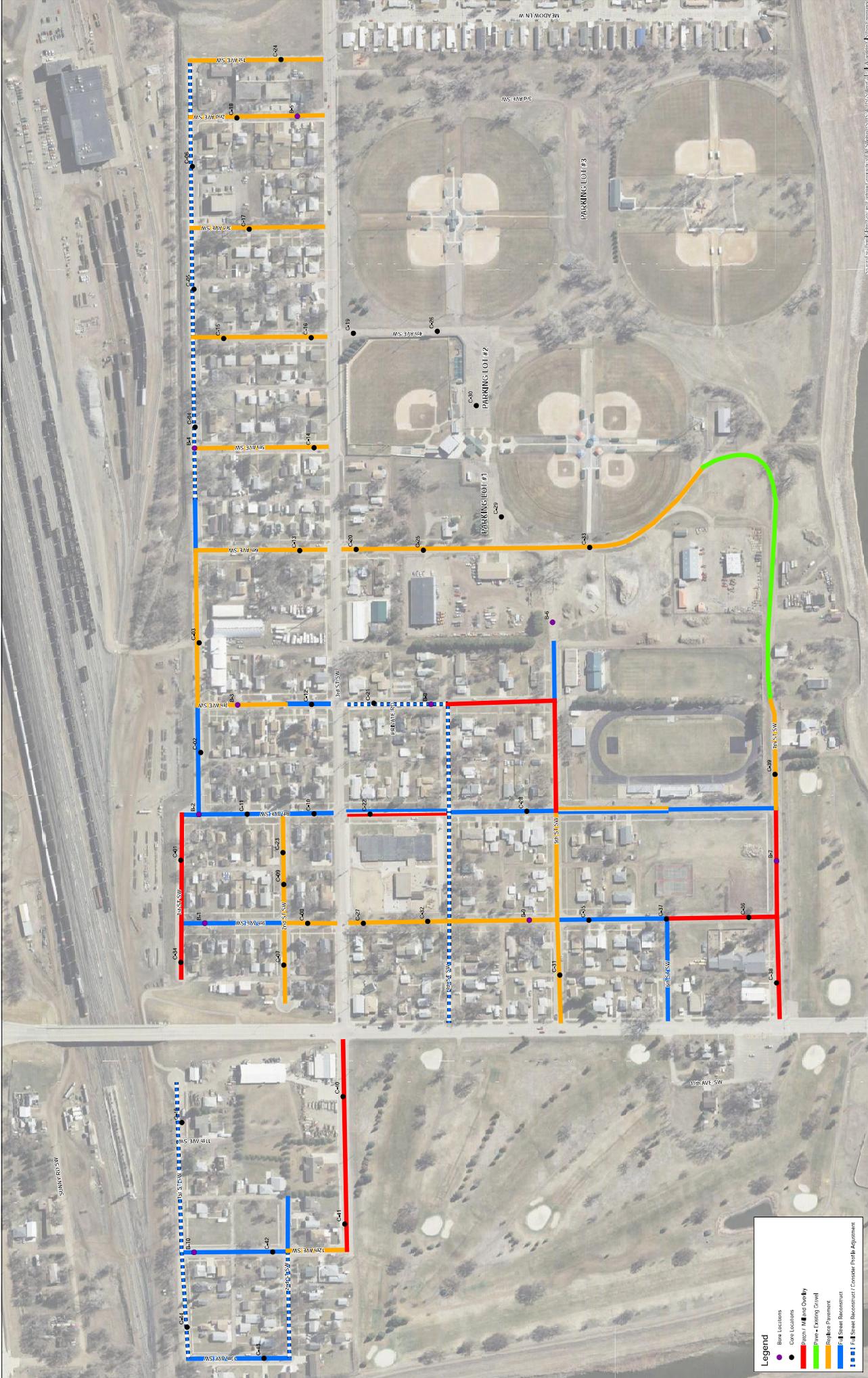
- Assessment Boundary
- Parcel
- Left Lines

SOUTH MANDAN STREET RECONSTRUCTION
MANDAN COURTYARD DEVELOPMENT

Scale: 1" = 200' Feet

EXHIBIT 1

moore engineering, inc.



MANDAN PROPOSED STREET RECONSTRUCTION

Legend

- Core Locations
- Core Locations
- Pipe + Existing Curbs
- Street Recommendation / Curbside Profile Agreement

0 100 200 400 800 Feet
1 in = 200 ft

moore
engineering, inc.

Exhibit 2

