

*insight • experience • results*

# Preliminary Engineering Report

## Downtown Sidewalks



---

**PROJECT # 23-1206**  
July 24, 2024

City of Oelwein  
20 2nd Avenue SW  
Oelwein, Iowa 50662

**PRELIMINARY ENGINEERING REPORT  
FOR  
DOWNTOWN SIDEWALKS  
PREPARED FOR:  
CITY OF OELWEIN**

Mayor	-	Brett DeVore
Council	-	Dave Garrigus
	-	Dave Lenz
	-	Lynda Payne
	-	Anthony Ricchio
	-	Karen Seeders
	-	Matt Weber
City Clerk	-	Barb Rigdon
City Administrator	-	Dylan Mulfinger

	<p>I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.</p> <p align="right">               July 24, 2024              _____              Jon S. Biederman, PE              License Number 13868              My license renewal date is December 31, 2024.              Pages covered by this seal: All Sheets         </p>
--	--

**Office Locations**

**ILLINOIS**

**Aurora**  
230 Woodlawn Avenue  
Aurora, IL 60506

**Champaign**  
1610 Broadmoor Drive  
Champaign, IL 61821

**Freeport**  
101 West Stephenson Street  
Freeport, IL 61032

**Marion**  
103 Airway Drive, Suite 3  
Marion, IL 62959

**Peoria**  
1904 NE Monroe Street  
Peoria, IL 61603

**Rochelle**  
515 Lincoln Highway  
Rochelle, IL 61068

**Rockford**  
200 Prairie Street, Suite 208  
Rockford, IL 61107

**Springfield**  
2160 South Sixth Street, Suite E  
Springfield, IL 62703

**IOWA**

**Cedar Rapids**  
200 5th Avenue SE, Suite 100  
Cedar Rapids, IA 52401

**Manchester**  
221 East Main Street, Suite 301  
Manchester, IA 52057

**West Union**  
128 South Vine Street  
West Union, IA 52175

**WISCONSIN**

**Monroe**  
1107 16th Avenue  
Monroe, WI 53566

**Sheboygan**  
909 North 8th Street, Suite 101  
Sheboygan, WI 53081

## Table of Contents

Introduction .....	2
Existing Conditions.....	3
Inspection Criteria.....	4
Deficiencies .....	5
Repair Solutions .....	7
Estimated Cost .....	9
Summary .....	10

### **Appendices**

Appendix A	Site Photos
Appendix B	Preliminary Opinion of Probable Cost
Appendix C	Site Map

## INTRODUCTION

The City of Oelwein has realized sidewalk conditions in the downtown area are deteriorating. Fehr Graham has inspected the sidewalks at the request of the City of Oelwein for the following streets:

- » South Frederick Avenue from 3rd Street SE to 2nd Street NW (2,720')
- » 2nd Street SW from 1st Avenue SW to 1st Avenue SE (650')
- » 1st Street SW from 1st Avenue SW to 1st Avenue SE (850')
- » West Charles Street from 1st Avenue SW to 1st Avenue SE (850')
- » 1st Street NE from South Frederick Avenue to 1st Avenue NE (325')

This is a total of 5,395 feet of street with sidewalks on both sides for all except 2nd Street SW. The total sidewalk length is approximately 10,510 feet.

This report discusses the current conditions of the sidewalks within the above-described area, deficiencies that exist, possible repair strategies, and estimated replacement costs.

## EXISTING CONDITIONS

Sidewalks within the reviewed area are of differing ages. The downtown improvement project from 2005 reconstructed many of the sidewalks within the area, specifically along Frederick Avenue and Charles Street. This project reconstructed the street and sidewalks along with replacing utilities. This portion of sidewalk is standard Portland Cement Concrete (PCC) (5" thick according to original plans) with a 12"+/- wide curvilinear paver strip, decorative diamonds, and paver surfacing at pedestrian ramps including paver detectable warning panels. Landscape areas with plantings were included in this project. Older sidewalk sections, mainly on the side streets to Frederick Avenue, are PCC surfaced with an estimated age of many sections being 40+ years.

## **INSPECTION CRITERIA**

The following items were reviewed during the site inspection of the sidewalks:

### **Accessible walking path**

An accessible path is to be a minimum of 3' wide with a cross slope no more than 2% with minimum 5' x 5' passing area every 200'.

### **Trip hazards**

Defined as one-quarter inch maximum of vertical offset or one-quarter inch to one-half inch with 2:1 vertical slope.

### **Curb ramps**

Detectable warnings, slopes less than 8.33%, trip hazards, 0.5" maximum curb height.

## DEFICIENCIES

A large percentage of the sidewalks are noted to have deficiencies.

The majority of sidewalks within the project area have a cross slope greater than 2%. While portions of the cross section can be greater than 2%, there should be a minimum 3' (recommended 5') wide section that is continual in the running direction of the sidewalk that has 2% or less cross slope to meet Americans with Disabilities Act accessibility requirements. Most sidewalk portions were constructed with a straight grade from the building to the curb, without the 'flatter' section at 2% or less. Cross slopes were field checked with a digital level. Cross slopes are commonly between 2% and 3%, clearly over the 2% maximum, with several areas exceeding 3%. The 2005 project plans indicate the new sidewalk cross slope to be 2% +/-, indicating that slopes over 2% were expected with the project. Older sidewalk sections typically have portions greater than 2% cross slope. A section of new (fall 2023) sidewalk was also found to have a cross slope greater than 2% due to constructing with a uniform cross slope. The only appreciable section without deficiency is that adjacent to the south side of the event center parking lot.

Another common deficiency is vertical displacement of greater than one-quarter inch. This typically occurs at the paver/PCC interface as pavers appear to have settled relative to the adjacent PCC. Portions of the curvilinear paver band are lower than the adjacent PCC, the decorative diamonds are commonly lower than adjacent surfacing, and curb ramp pavers have settled around the perimeter of the intersection. The vertical offset is commonly 0.5" plus. There are multiple PCC panels throughout the project area that have vertically shifted as well.

Curb ramps within the 2005 project area, aside from the significant vertical offsets mentioned above, meet slope requirements. The detectable warning pavers have settled relative to the curb in many locations, leading to a vertical offset greater than 0.25". Detectable warning paver movement is a common issue when used as their location sees occasional vehicle turning traffic, which tends to cause movement.

Curb ramps within older sidewalk sections do not meet current requirements of curb height (0.5"), do not have detectable warning panels, or have excessive slope. There are few curb ramps within the project area that would be considered fully compliant.

Curb stop boxes for water services were typically sleeved when the 2005 PCC sidewalk was constructed. Many of the boxes are either lower or higher than the adjacent surface. Those higher are likely pushed up by frost and then do not lower on their own. All of these can be a tripping or falling hazard. Any holes within the sidewalk should be 0.5" or less in size. Many curb stops are missing the curb box lid, which leaves a hole in the sidewalk of 4"+/- diameter.

A few portions of sidewalk show settling, which leads to a low point within the sidewalk that does not drain. This ultimately leads to cracking of the PCC and quick deterioration along with icing in the winter months. Causes may be from inadequate compaction of utility trenches or coal vaults or general lack of compaction.

Some PCC panels are cracked, but not more than would be expected for the age of the PCC. Older sections commonly have more cracks than the 2005 sections. The cracks are problematic only when vertically separated – otherwise, they are just a visual deficiency. Currently, there is significant

vegetation growing in joints between pavers as well as some PCC joints throughout the project area. This is caused by organic debris settling in the joints. It takes very little organic material for vegetation to grow, especially when there are frequent rain events as we have had this spring and summer. This makes the area look very rough and can promote further joint deterioration.

In general, there are few sidewalk sections of appreciable length within the project area that are fully compliant for accessibility.



## REPAIR SOLUTIONS

Pavers were an important component of the 2005 project and add to the aesthetic value of the downtown area. They looked great for the first years after construction. Now, the pavers are settling and causing trip hazards with vertical displacement over 0.25" being very common throughout the downtown area. The original plans indicated a PCC base with sand setting bed between the PCC base and paver. In theory, this creates a stable base that will keep pavers from settling or moving. In reality, the pavers have moved. Removal/replacement of sidewalk sections for recent utility repairs have shown that some portions of the paver band have a PCC base but others do not. Portions without the PCC base can be expected to settle and shift. Portions with the PCC base should only show paver settling if the sand setting bed has worked its way out of the pavers, through joints. This is not expected but may be taking place. Additionally, it appears PCC sections on either side of the pavers are shifting in many locations. In general, pavers adjacent to PCC slabs for streets and sidewalks are hard to keep elevation matched over time. The frost action we see in our climate tends to cause displacement. The pavers can be removed, the base corrected, and the pavers replaced. This would not correct the cross slopes greater than 2% and would likely address the vertical offset for a few years but not long term.

A continual accessible pedestrian path of minimum 3' width at 2% or less cross slope will be best achieved by replacement of the existing sidewalk. Creating this path will minimally require the majority of the PCC cross-section to be replaced. Leaving the remainder after the 1.5% portion does not make sense from a visual perspective and would cause three cross slopes per cross section vs two if fully reconstructed. The typical design strategy for sidewalks in a downtown setting where the sidewalk must meet the existing building and the existing curb is to create a minimum 5' wide section with a cross slope of 1.5%, commonly at the building side of the sidewalk. The remaining sidewalk section would match the curb height and be at a variable slope, allowed to be greater than 2%. The replacement could come in a variety of options. Pavers could be a portion of the project but would have the same ongoing issues as currently exist and will have additional maintenance. Using standard PCC for the sidewalks will provide the longest-lasting and lowest maintenance surface. There are options to upgrade PCC aesthetics with the common ones being integral coloring (colored throughout the PCC thickness), stamping, and joint treatment, such as tooled joints.

A recommended sidewalk thickness would be 5.5" with reinforcement. This will hold up to light vehicles that may be used for snow removal and reinforcement will reduce vertical displacement of panels. Common sidewalk reinforcement is #4 coated rebar (or #3 glass fiber reinforced polymer 'GFRP'). Driveways and alleys would be thickened to 7". Due to sidewalks commonly receiving heavy deicers during the winter months that can deteriorate PCC prematurely, a sealer to reduce water entering the PCC and therefore freeze/thaw damage is recommended. An integral sealing product can be added to the mix to provide long-lasting protection.

Integral coloring for PCC is available in many colors. Neutral shades are recommended as brighter colors can fade to unattractive colors over time. Darker shades can melt snow faster and may be advantageous. Joints can be a standard saw cut or aesthetically enhanced by tooling.

Stamping either all of the sidewalk or a band is an aesthetic upgrade. Options for stamping are infinite and can range from texture, brick pattern, flag stone, wood plank, and many others. Examples are here: <https://www.prolinestamps.com/magnetic-stamps>

Curb stop boxes are recommended to be placed within a standard valve box riser (poured into the PCC) with standard valve box lid. This eliminates the box being above or below sidewalk elevation and open holes around the boxout. These are easily added during construction and provide great long-term protected access.

Detectable warning panels, required at pedestrian curb ramps, are recommended to be heavy-duty cast iron, placed into the PCC sidewalk. This material is virtually indestructible and will not settle or move like paver panels.

Both colored and stamped concrete can be difficult to match if replacement is necessary, such as for a utility replacement. It would be recommended for the city to retain the necessary stamps for future use. This is not a reason to eliminate but is something to be aware of.

While the majority of the sidewalks within the project area do not meet all accessibility standards, replacement as a single project will likely exceed the City's budget for this work. A strategy to replace in phases, one to two blocks at a time, may be more budget-friendly. These block sections are independent of other blocks so construction of one block would not affect the next.

Work should progress quickly as little grading should be necessary after existing sidewalk removal, minimizing access restrictions to businesses. Existing landscape areas will have plants disturbed with reconstruction. Plants can be removed ahead of the project and replaced after. The extent of landscape areas will be a discussion point with the City as the areas could be increased or decreased. Decreasing the landscape areas and adding more concrete will increase the overall project cost.

## **ESTIMATED COST**

The estimated cost of new reinforced standard (no coloring, special jointing, or stamping) 5.5" thick PCC is \$70 per square yard. This excludes removal of existing sidewalk, fine grading, and other work that may be necessary. These items would be done regardless of the type of surfacing that is replaced and are estimated in the included preliminary opinion of probable cost.

Integral color to the PCC mix will add between \$30 and \$60 per square yard, depending upon the color that is selected.

Stamping is expected to be in the \$130 to \$150 per square yard range.

The addition of tooled joints may add \$4 per square yard and the addition of integral sealer may add \$3 per square yard.

Refer to the attached preliminary opinion of probable cost for additional details. The total estimated cost for the project area with standard PCC is \$1,666,854. The estimated cost for one block of reconstruction (South Frederick Avenue between 1st Street and West Charles Street) is \$177,765. Other blocks differ but this gives an idea of how a project can be broken down into smaller phases.

## **SUMMARY**

The sidewalks within the downtown project area generally do not comply with current accessibility requirements. There are multiple options for replacement which should be further discussed.

Eliminating pavers from the sidewalks will reduce future maintenance and accessibility issues.

Replacement with quality components and sound design should last the City of Oelwein for decades.

## **Appendices**

## **Appendix A**

### **Site Photos**



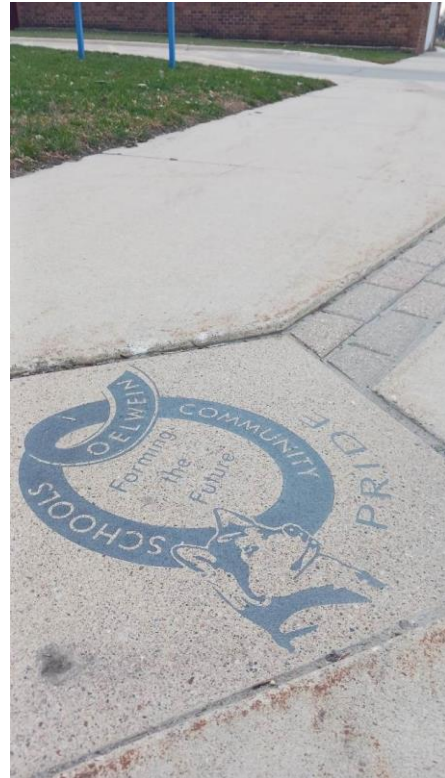
Paver settling, greater than 0.25"



Pavement settling along paver band



Curb stop box protruding with opening around box



Paver and diamond settling, greater than 0.25"

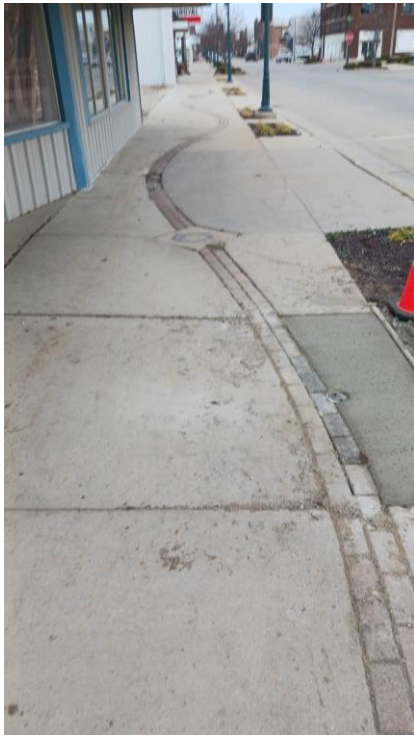




Crack with vertical displacement



Cross slope greater than 2%



Settling of sidewalk creating a low point without drainage



Paver band setting greater than 0.25





Severely broken PCC



Paver settling greater than 0.25"



Heaving pavers with vertical displacement greater than 0.25"



Cross slope greater than 0.25"



PCC displacement greater than 0.25"



Non-compliant pedestrian ramp



Compliant sidewalk





Broken/missing PCC with vertical displacement greater than 0.25"



Non-compliant pedestrian ramp



Paver band and diamond settling



Severely broken PCC





Non-compliant curb ramp



Non-compliant curb ramp



Cross slope greater than 2%



New sidewalk with greater than 2% cross slope





Settled PCC panel



Non-compliant curb ramp



Curb height greater than 0.5"



Settled pavers around curb ramp perimeter



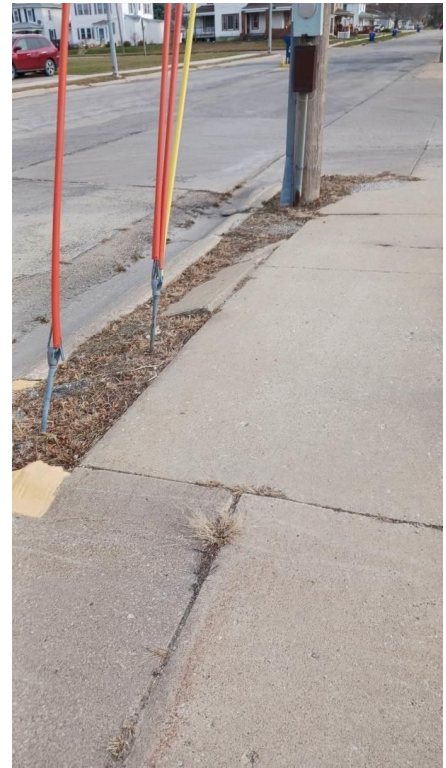
Protruding curb stop



Paver and diamond settling



Panel displacement



'Curb' within pedestrian walkway

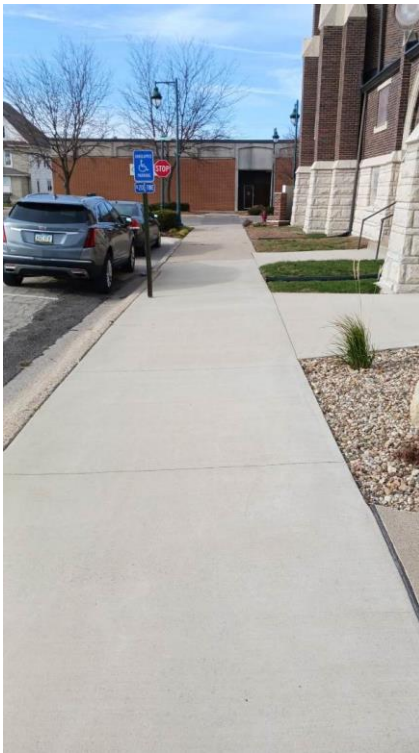




Protruding water valve



Non-complaint pedestrian curb ramp



Cross slope in excess of 2%



PCC displacement across paver band



Non-compliant pedestrian curb ramp



Non-compliant pedestrian curb ramp



Vertical PCC displacement greater than 0.25" and cross slope greater than 2%





Missing paver causing trip hazard



Settled pavers and diamond along with crack from end of diamond



Settled pavers and diamond



Vegetation in joints



Vegetation in joints

## **Appendix B**

### **Preliminary Opinion of Probable Cost**

**Preliminary Opinion of Probable Cost  
Downtown Sidewalk Replacement, City of Oelwein, Iowa**

Replacement of sidewalks within the defined project area with standard PCC

NO.	CODE	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	2010-G	SUBGRADE PREPARATION	11587	SY	\$ 5.00	\$ 57,935
2	5020-F	CURB BOX ADJUSTMENT, MINOR	70	EA	\$ 150.00	\$ 10,500
3	6010-E-1	MANHOLE ADJUSTMENT, MINOR	3	EA	\$ 1,100.00	\$ 3,300
4	7010-A	PAVEMENT, PCC, 5.5" THICK, REINFORCED, STANDARD COLOR AND FINISH	9787	SY	\$ 70.00	\$ 685,090
5	7010-A	PAVEMENT, PCC, 7 THICK, REINFORCED, STANDARD COLOR AND FINISH	1800	SY	\$ 76.00	\$ 136,800
6	7010-E	CURB AND GUTTER, PCC, 30" WIDE, 6.5" THICK	1000	LF	\$ 35.00	\$ 35,000
7	7030-G	DETECTABLE WARNING	1380	SF	\$ 55.00	\$ 75,900
8	7040-H	PAVEMENT REMOVAL	11587	SY	\$ 10.00	\$ 115,870
9	7040-I	CURB AND GUTTER REMOVAL	1000	LF	\$ 9.00	\$ 9,000
10	9999-A	LANDSCAPE REPAIR	1	LS	\$ 25,000.00	\$ 25,000
11	8030-A	TEMPORARY TRAFFIC CONTROL	1	LS	\$ 7,000.00	\$ 7,000
12	11,020-A	MOBILIZATION	1	LS	\$ 75,000.00	\$ 75,000

<b>ESTIMATED CONSTRUCTION AMOUNT</b>	\$	1,236,395
<b>CONSTRUCTION CONTINGENCY (15%)</b>	\$	185,459
<b>DESIGN AND CONSTRUCTION ENGINEERING</b>	\$	245,000
<b>ESTIMATED PROJECT TOTAL</b>	\$	1,666,854

POSSIBLE UPGRADES TO PCC SIDEWALKS

INTEGRAL COLORING	\$30 TO \$60 PER SY
STAMPING (MAY BE LOWER SUBJECT TO QUANTITY)	\$130 TO \$150 PER SY
TOOLED JOINTS	\$4 PER SY
INTEGRAL SEALER	\$3 PER SY

Dated: July 23, 2024

**Preliminary Opinion of Probable Cost  
Downtown Sidewalk Replacement, City of Oelwein, Iowa**

Replacement of sidewalks on S. Frederick between 1st Street and W. Charles Street with standard PCC

NO.	CODE	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
1	2010-G	SUBGRADE PREPARATION	1146	SY	\$ 5.00	\$ 5,730
2	5020-F	CURB BOX ADJUSTMENT, MINOR	19	EA	\$ 150.00	\$ 2,850
3	7010-A	PAVEMENT, PCC, 5.5" THICK, REINFORCED, STANDARD COLOR AND FINISH	1146	SY	\$ 70.00	\$ 80,220
4	7030-G	DETECTABLE WARNING	288	SF	\$ 55.00	\$ 15,840
5	7040-H	PAVEMENT REMOVAL	1146	SY	\$ 10.00	\$ 11,460
6	9999-A	LANDSCAPE REPAIR	1	LS	\$ 5,000.00	\$ 5,000
7	8030-A	TEMPORARY TRAFFIC CONTROL	1	LS	\$ 2,000.00	\$ 2,000
8	11,020-A	MOBILIZATION	1	LS	\$ 8,000.00	\$ 8,000

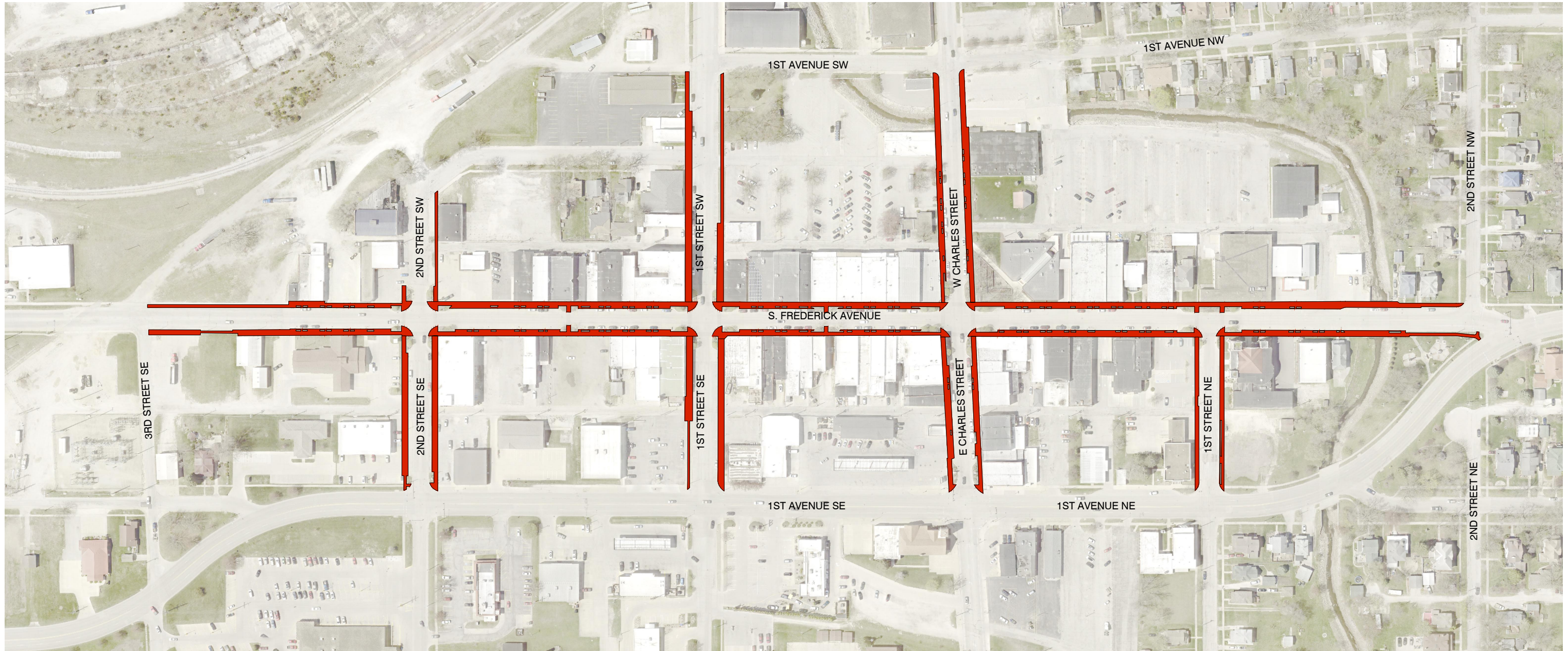
<b>ESTIMATED CONSTRUCTION AMOUNT</b>	\$	131,100
<b>CONSTRUCTION CONTINGENCY (15%)</b>	\$	19,665
<b>DESIGN AND CONSTRUCTION ENGINEERING</b>	\$	27,000
<b>ESTIMATED PROJECT TOTAL</b>	\$	177,765

Dated: July 23, 2024

## **Appendix C**

### **Site Map**





 EXISTING SIDEWALK



100 0 100 200 300 FEET

**FEHR GRAHAM**  
ENGINEERING & ENVIRONMENTAL

ILLINOIS  
IOWA  
WISCONSIN

OWNER/DEVELOPER:  
CITY OF OELWEIN  
20 2ND AVENUE SW  
OELWEIN, IA 50662

PROJECT AND LOCATION:  
OELWEIN DOWNTOWN SIDEWALK  
REPORT  
OELWEIN, IOWA

DRAWN BY: JRA  
APPROVED BY: JCB  
DATE: JULY 2024  
SCALE: AS NOTED

REVISIONS		
REV. NO.	DESCRIPTION	DATE

DRAWING:  
SITE MAP

SET TYPE: FINAL  
G:\C30\23-1206\23-1206 SW AREA COUNT-RL.dwg, S.O OVERALL

JOB NUMBER:  
23-1206

SHEET NUMBER:  
S.00



# **FEHR GRAHAM**

---

ENGINEERING & ENVIRONMENTAL

[fehrgraham.com](http://fehrgraham.com)

