PLANNING BOARD MEETING
City Hall - 950 Locust St., Carter Lake, Iowa
Monday, September 8, 2025, 7:00 P.M.

AGENDA

Roll Call

Approval of the Agenda

1. Consent Agenda
    a. Building Permits listing
    b. City Council Minutes
    c. Planning Board Minutes
2. New Business
    a. "The Residence"- Overland Property Group
        i. Final site plan – site plan attached
        ii. Building permit – plan review attached
    b. Omaha Indian Tribe of Nebraska
        i. SWPPP
    c. Lakeside Mobile Home Park
        i. Fence permit
    d. Non-residential permits – pre-approved
3. Old Business
    a. Planning Board rezoning – workshop
4. Comments
5. Adjourn

PLANNING BOARD MEETING
Monday, August 11, 2025

At 7:00 p.m. Board Chair Ed Palandri called the meeting to order. Roll Call: Present: Ed Palandri, Jay Gundersen, Ray Pauly, Drew Evers, Kathryn Dueling Robert Horan and Tim Podraza are all present along with City Clerk Jackie Carl.

Podraza moved to approve the agenda seconded by Pauly with the changes; unanimously approved. Pauly moved to approve the consent agenda consisting of building permit listing for July, council minutes, seconded by Dueling; unanimously approved.

New Business: Overland Property Group preliminary site plan and pre-permit approval. Dueling moved for approval and seconded by Gundersen. Roll Call: Yes-Podraza, Dueling, Evers, Pauly. No-Gundersen, Palandri, Horan.

Non residential permits issued pre-approval: Casey's General Store sign update and Omaha Tribe of Nebraska temporary fence.

Planning Board rezoning workshop for Monday, August 25 at 6:30 p.m.

Dueling moved to adjourn seconded by Horan. Adjourn at 8:00 p.m.

CARTER LAKE CITY COUNCIL MEETING

Monday, August 18, 2025

Mayor Ronald Cumberledge called the regular meeting to order at 7:00 p.m. Roll call of the council, present: Mayor Ronald Cumberledge, Jacob Hanika. Jackie Wahl, Aaron Grell, Victor Skinner and Jason Gundersen; City Attorney Clint Fichter and Clerk Jackie Carl.

Gundersen moved to approve the agenda, seconded by Hanika; unanimously approved. Wahl moved to approve the consent agenda, by Gundersen, unanimously approved. Consent agenda includes the following: Department head reports from Parks, Library, Community Center, Senior Services, Maintenance, Police, Fire/EMS; City council minutes; overtime and comp-time reports, abstract of claims, receipts and financial reports for July 2025.

At the workshop on Wednesday, the council received a detailed update regarding the wastewater monitoring manhole project from Engineer Elizabeth Hunter. Based on the estimated cost of the project it qualified for the competitive bid process for procurement of contract. Gundersen moved to proceed, seconded by Hanika; No-Grell Yes-Gundersen, Hanika, Skinner, Wahl.

Grell moved to table approving the salvage license for City Motor's for another 30 days to allow for the management to clean up the rest of the property to meet council approval, seconded by Skinner; unanimously approved.

Fire Chief Dave Huey new members proposed, Gundersen moved to approve Patrick Knudsen for fire department membership, seconded by Grell; unanimously approved. Gundersen moved to approve Tia Frison for fire department membership, seconded by Grell; unanimously approved.

Skinner moved to approve the pay scales for fire and EMS volunteers seconded by Grell; unanimously approved. Roll Call: No-Gundersen Yes-Hanika, Wahl, Skinner, Grell. Skinner moved to table the proposed retirement program seconded by Wahl; unanimously approved.

Mayor questioned why the Fire Department does not qualify for the Safer Grant from the Iowa West Foundation that has a program that all departments in Pottawattamie County received grants for gear. Phil and City Attorney will draft a letter to push back on this decision.

City Attorney summarized updates on several ongoing matters. 122 Carter Lake Club; dogs at large

VA transportation, retirement benefit for volunteers and seeking members to join committee to discuss the renovation or new construction for the volunteer fire station.

Mayor asked Gundersen and Grell to bring names of contractors to proceed with repairing water stop boxes. Council agreed to engage a contractor to do 3-4 at a time.

Gundersen moved to approve moving the GIS mapping contract to Snyder and Associates, Hanika seconded the motion; Roll call: no-Grell yes-Gundersen, Hanika, Wahl, Skinner.

Skinner moved to cancel grant writer contract, seconded by Grell; unanimously approved.

Gundersen updated that T-Mobile is providing new equipment to the pump station call system

Street repairs that Jason met with Lem to discuss accepting bid for concrete repairs, seconded by Grell; unanimously approved.

Grell moved to approve resolution for wage increases for longevity pay, Gundersen seconded; unanimously approved. Skinner moved to approve policy regarding distribution of minutes, seconded by Grell, Roll Call: Yes-Skinner, Wahl, Hanika, Grell, Gundersen.

Planning Board Member Jay Gundersen approached to discuss right of way permits and stormwater retention at the planned apartment complex. Encouraged the council to consider making changes to eliminate above ground retention.

Adjourn at 8:00 p.m.

Jackie Carl, City Clerk Ronald Cumberledge, Mayor

Stormwater Alerts

Iowa Department of Natural Resources-StormWater Program <StormWater_Program@dnr.iowa

To Jackie Carl

Reply Reply All Forward

Thu 9/4/2025 6:02 AM

You forwarded this message on 9/4/2025 12:00 PM.
If there are problems with how this message is displayed, click here to view it in a web browser.

9/4/2025

Stormwater Alerts

These are recent storm water general permit activities that have occurred

Authorization Number	Facility Name	City Name	Date	Description	Acres
46523-46099	QUICK CURRENT DATA CENTER SITE PREPARATION (GP #2 - Construction Activity)	CARTER LAKE	9/4/2025	Issued	9.6
46522-46098	THE RESIDENCE AT CARTER LAKE (GP #2 - Construction Activity)	CARTER LAKE	9/4/2025	Issued	3.4
46523-46099	QUICK CURRENT DATA CENTER SITE PREPARATION (GP #2 - Construction Activity)	CARTER LAKE	9/4/2025	Issued	9.6
46522-46098	THE RESIDENCE AT CARTER LAKE (GP #2 - Construction Activity)	CARTER LAKE	9/4/2025	Issued	3.4

FOR OFFICE USE: CASE # ______________________ Receipt # ______________
Z.B.A. Public Hearing: ______________________ Amount ______________

CITY OF CARTER LAKE

APPLICATION FOR PLANNING BOARD AGENDA

1. APPLICANT: Overland Property Group Phone: 785-201-4046
   Address: 5345 W. 151st Terrace, Leawood, KS 66224 *Status: O.H.

2. REPRESENTED BY: Elizabeth A. Hunter, PE, AICP Phone: 712-322-3202
   Address: 231 Bennett Ave, Council Bluffs, IA 51503 *Status: A

3. STREET ADDRESS/LOCATION: NE Corner of intersection of N. 9th Street & Avenue K

4. LEGAL DESCRIPTION: CARTER LAKE-AUD SUB 21-75-44 LT 5 LTS C, D & E

5. OWNERS NAME: Mikel USA, Inc.

6. OWNERS ADDRESS: 2813 N. 9th Street, Carter Lake, IA 51510

7. REASONS FOR REQUEST AND INTENDED USES: Replatting for development of a Senior Housing Complex

8. ZONING DISTRICT: R-2

9. PRESENT USE: Vacant Grassed Lot

10. COPY OF BLUEPRINTS OF INTENDED STRUCTURE. Civil & Partial Architecural Sets attached

11. ADMINISTRATIVE DECISION ISSUED: ______________________

FOR OFFICE USE

12. ATTACHED TO THE APPLICATION ARE:
    a. Denied "Building Permit Application" Form……………………..… ______________
    b. Approves…………………………………………………………..……… ______________
    c. Restrictions………………..……………………………………… ______________

THE FACTS PRESENTED ABOVE ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE:

13. SIGNATURE: Elizabeth A Hunter Date: 09/02/2025

TYPED OR PRINTED NAME: Elizabeth A. Hunter *Status: A

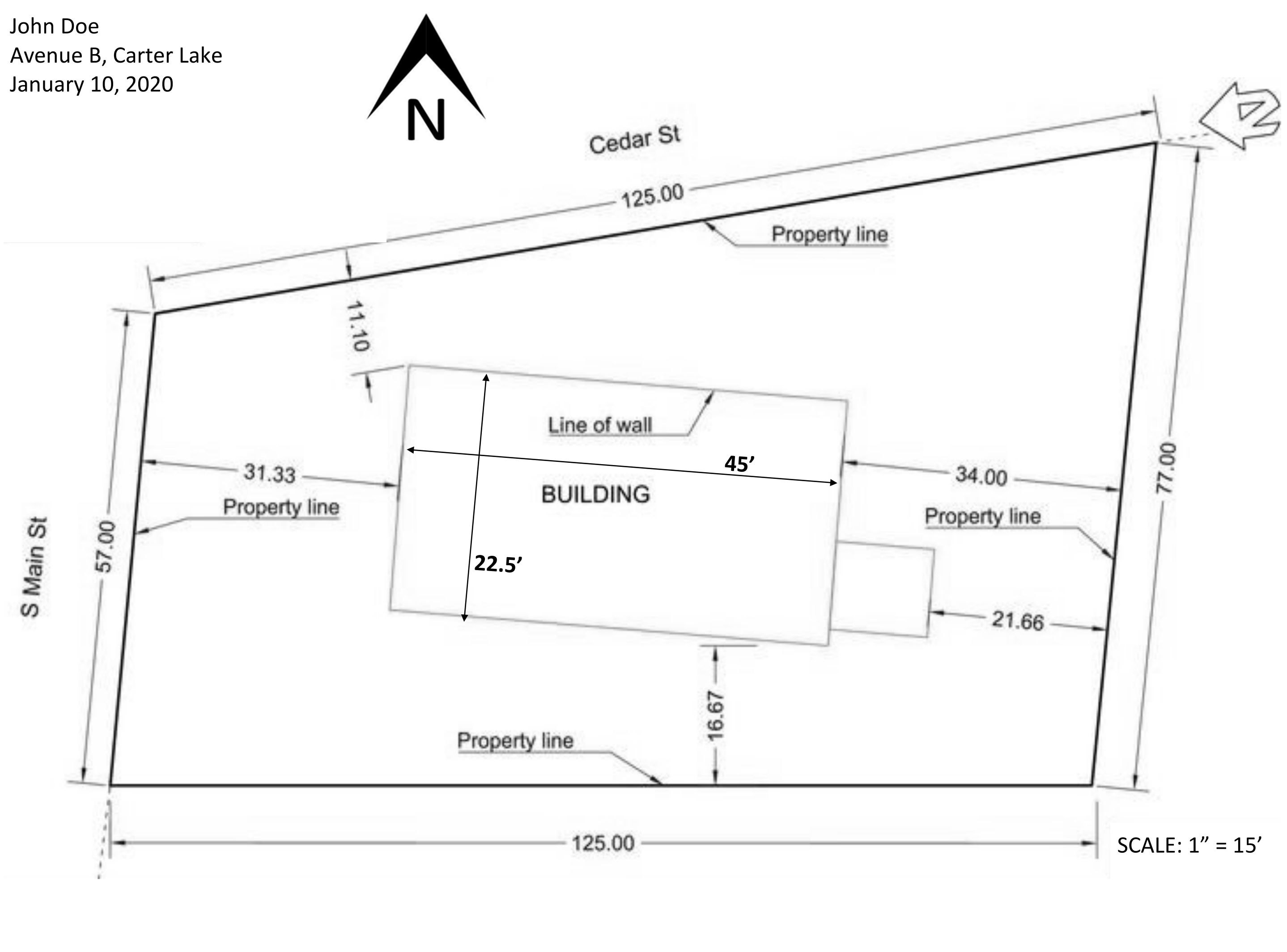
***NOTE:** *P.O. = Property Owner* *C.P. = Contract Purchaser*
O.H. = Legal Optionholder *A. = Owner's authorized agent*

MINIMUM REQUIRED INFORMATION (TO BE SHOWN ON THE SITE PLAN)

The site plan shall be legibly and accurately drawn on paper suitable for reproduction. The plan shall be drawn to a scale of 1 inch to 50 feet or less and should have an overall size of 8 1/2" x 11" or if not possible then a maximum size of 11" x 17" The plan shall contain the following information:

1. The name and address of the person filing the application
2. The date, scale and north arrow
3. Property lines
4. Street, sidewalks and alleys
5. Blueprint proposed structures (copy to be left with the planning board and building inspector)
6. Existing structures within 20 fee of the property
7. Accurate dimensions of the property and all structures involved.

SAMPLE SITE PLAN

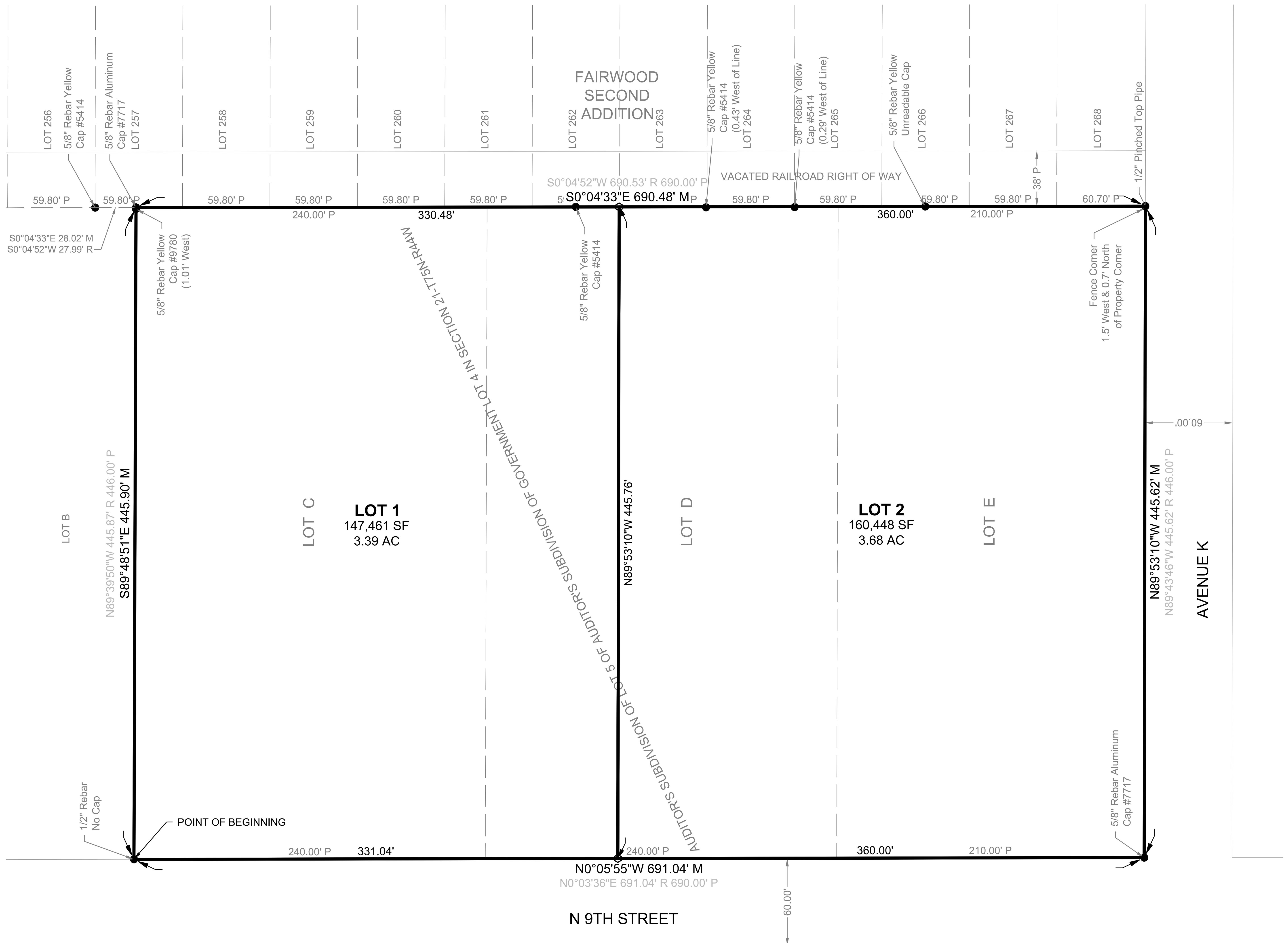


THE RESIDENCE AT CARTER LAKE
FINAL PLAT
A REPLAT OF LOTS C, D, AND E, AUDITOR'S SUBDIVISION OF LOT 5 OF AUDITOR'S SUBDIVISION OF LOT 4 IN SECTION 21, TOWNSHIP 75 NORTH, RANGE 44 WEST OF THE 5TH P.M., POTTAWATTAMIE COUNTY, IOWA.

AREA ABOVE RESERVED FOR RECORDER

INDEX LEGEND

SURVEYOR'S NAME / RETURN TO:
TARRON MEAIKE, PLS
SNYDER & ASSOCIATES, INC.
231 BENNETT AVENUE
COUNCIL BLUFFS, IOWA 51503
712-322-3202
TMEAIKE@SNYDER-ASSOCIATES.COM
SERVICE PROVIDED BY:
SNYDER & ASSOCIATES, INC.
SURVEY LOCATED:
LOTS C, D & E
AUDITORS SUBDIVISION OF LOT 5 OF
AUDITORS SUBDIVISION OF GOVERNMENT LOT 4
SEC. 21-T75N-R44W
REQUESTED BY:
JONES GILLIAM RENZ ARCHITECTS



PROPRIETOR'S DEDICATION

1. NO PRIVATE RESTRICTIONS AND/OR COVENANTS WILL BE RECORDED WITH THE SUBDIVISION.

KNOW ALL PERSONS BY THESE PRESENTS THAT MIKEL USA INC. BEING THE SOLE OWNER OF THE PROPERTY DESCRIBED IN THE PLAT DESCRIPTION AND EMBRACED WITHIN THIS PLAT, HAVE CAUSED THE SAME TO BE SUBDIVIDED AS LOT 1 AND LOT 2 TO BE KNOWN AS THE RESIDENCE AT CARTER LAKE.

IN WITNESS THEROF, I DO HEREBY RATIFY AND APPROVE OF THE DISPOSITION OF THE PROPERTY AS CONTAINED HEREIN ON THIS_____ DAY OF____________, 20____

BY:____

MIKE LEVELL, PRESIDENT, MIKEL USA INC DATE

STATE OF ___________________

COUNTY OF _________________

ON THIS _____ DAY OF ______________, 20____, BEFORE ME A NOTARY PUBLIC IN AND FOR THE STATE OF _____________, PERSONALLY APPEARED MIKE LEVELL, TO ME PERSONALLY KNOWN, WHO BEING BY ME DULY SWORN, AND THAT SAID INSTRUMENT WAS SIGNED ON BEHALF OF MIKEL USA INC AND MIKE LEVELL ACKNOWLEDGED THE EXECUTION OF THE INSTRUMENT TO BE THE VOLUNTARY ACT AND DEED OF SAID MIKEL USA INC BY IT VOLUNTARILY EXECUTED.

____

NOTARY PUBLIC IN AND FOR SAID STATE

MY COMMISSION EXPIRES _____________

CITY COUNCIL

____

APPROVED BY MAYOR: DATE
THE HONORABLE RON CUMBERLEDGE

ATTESTED TO BY:

____

CITY CLERK: JACKIE CARL DATE

____

PLANNING BOARD CHAIRMAN DATE

CERTIFICATE OF TREASURER OF POTTAWATTAMIE COUNTY, IOWA

I, THE TREASURER OF POTTAWATTAMIE COUNTY, IOWA HEREBY CERTIFY THAT THE PROPERTY INCLUDED IN THE RESIDENCE AT CARTER LAKE, IS FREE FROM CERTIFIED TAXES AND CERTIFIED SPECIAL ASSESSMENTS.

____

TREASURER OF POTTAWATTAMIE COUNTY, IOWA: LEA VOSS

PLAT DESCRIPTION

ALL OF LOTS C, D AND E, AUDITOR'S SUBDIVISION OF LOT 5 OF AUDITOR'S SUBDIVISION OF GOVERNMENT LOT 4 IN SECTION 21, TOWNSHIP 75 NORTH RANCH 44 WEST OF THE 5TH P.M. IN THE TOWN OF CARTER LAKE, POTTAWATTAMIE COUNTY, IOWA AND DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF SAID LOT C; THENCE SOUTH 89°48'51" EAST ALONG THE NORTH LINE OF SAID LOT C, 445.90 FEET TO THE NORTHEAST CORNER OF SAID LOT C; THENCE SOUTH 0°04'33" EAST ALONG THE EAST LINE OF SAID LOTS C, D AND E, 690.48 FEET TO THE SOUTHEAST CORNER OF SAID LOT E, THENCE NORTH 89°53'10" WEST ALONG THE SOUTH LINE OF SAID LOT E, 445.62 FEET TO THE SOUTHWEST CORNER OF SAID LOT E; THENCE NORTH 0°05'55" WEST ALONG THE WEST LINE OF SAID LOTS C, D AND E, 691.04 FEET TO THE POINT OF BEGINNING AND CONTAINING 7.07 ACRES (307,909 SQUARE FEET) MORE OR LESS.

WARRANTY DEED DESCRIPTION (DOCUMENT #2010-008111)

LOTS C, D, AND E AUDITOR'S SUBDIVISION OF LOT 5 OF AUDITOR'S SUBDIVISION OF GOVERNMENT LOT 4 IN SECTION 21, TOWNSHIP 75, RANGE 44 IN THE TOWN OF CARTER LAKE, POTTAWATTAMIE COUNTY, IOWA.

LEGEND

FEATURES	FOUND	SET
Section Corner	▲	△
1/2" Rebar, Yellow Cap # 23722 (Unless Otherwise Noted)	●	○
ROW Marker	■	□
ROW Rail		
Control Point	⊙CP	
Bench Mark		
Platted Distance	P	
Measured Bearing & Distance	M	
Recorded As	R	
Deed Distance	D	
Calculated Distance	C	
Centerline		
Section Line		
1/4 Section Line		
1/4 1/4 Section Line		
Easement Line		

DATE OF SURVEY
JUNE 23, 2025

OWNER
MIKEL USA INC

DEVELOPER
OVERLAND PROPERTY GROUP
5345 W. 151ST TERRACE
LEAWOOD, KANSAS 66224
785-201-4046

BASIS OF BEARING
IA REGIONAL CS ZONE 6
US SURVEY FEET;
IA RTN DERIVED
NAD83(2011) (EPOCH 2010.00)

0 50
FEET

LICENSED PROFESSIONAL LAND SURVEYOR
TARRON MEAIKE
P23722
IOWA

I hereby certify that this land surveying document was prepared and the related survey work was performed by me or under my direct personal supervision and that I am a duly licensed Professional Land Surveyor under the laws of the State of Iowa.

Tarron Meaike 09-02-2025
Tarron Meaike, PLS Date

License Number P23722

My License Renewal Date is December 31, 2025

Pages or sheets covered by this seal:
SHEET 1 OF 1

MARK | REVISION | DATE | BY

Engineer: | Checked By: TEM | Scale: 1" = 50'
Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21
Project No: 125.0711.10 | Sheet 1 OF 1

THE RESIDENCE AT CARTER LAKE
FINAL PLAT
CARTER LAKE, IOWA
SNYDER & ASSOCIATES, INC.
231 BENNETT AVENUE
COUNCIL BLUFFS, IOWA 51503
712-322-3202 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 125.0711.10
Sheet 1 OF 1

CITY OF CARTER LAKE
Building & Zoning Department
950 Locust Street
Carter Lake, IA 51510
Telephone: (712) 847-0535
Fax: (712) 347-5454
Inspection Request: (712) 347-6320
https://www.carterlake-ia.gov

COMMERCIAL PLAN REVIEW BUILDING CODE COMMENTS

Date: September 4th, 2025

Designer: Jones Gillam Renz Architects
Attn: Elizabeth Hunter
730 N 9th Street
Salina, KS 67401

Project: The Residence at Carter Lake

Project Location: *Avenue K & 9th Street (south-east corner of intersection)*

Project Description: New *(Senior-Living)* Apartment Building & Site Development
Occupancy Group: R-3 *(residential-apartments)*
Type of Construction: V-B *w/AFES (S13R)*
Building Area Sq Ft: 51,603 *(59,400 code allowed)*
Building Height: 40-feet/3-Story *(60-feet/4-Story code allowed)*
Occupancy Load: 301
Number of Exits: 6 provided ground-level *(6 code required)*

SITE PLAN REVIEW

- Current Zone District: R-3 *(Urban Residential Multi-family)* This is an allow use in this district.
- Site Plan Review of the performance point requirements for this project proposed site development, exceeding the minimum performance points of 30 and has addressed all other development city zoning regulations including all yard setbacks, parking, landscaping, and the minimum drainage runoff controls/stormwater management based SUDAS requirements for this project establish on the licensed civil engineer's working design.
- According to the proposed Re-Plat of this property will require revisions to the site plan(s) including the drainage controls/stormwater management. This will need to be submitted and approved by the Building Official before any grading permit shall be issued for this project.
- Planning Board will need to assign a street address for this project.

ARCHITECTURAL & ACCESSIBLE CODE COMMENTS

1. All accessible man-doors shall have approved opening hardware capable of operation without tight grasping, pinching, or twisting of the wrist. [IBC 1008.1.8.1 & ICC/ANSI A11.7.1]
2. Locations of fire extinguishers *(for class A hazards)* placed at conspicuous locations with maximum travel distance to fire extinguishers of 75-feet or less along paths of egress per code. [IBC 906] To be verified with the City Building Inspector and City Fire Department.

3. Provide deferred plan submittal on fire sprinkler and life safety intentions. Please note, this plan review and approval of plans/documents is required before any required secondary life-safety building permit(s) will be issued by the City and before any of secondary construction can commence. [NFPA 13 2016 8.15.7.2]

4. Provide the code required Energy (COMcheck www.energycodes.gov/comcheck) Compliance report(s) for the construction of proposed tenant improvement area using the 2012 edition of the International Energy Conservation Code as a deferred submittal. [State Required - IECC 103]

5. Provide All energy mechanical, electrical, and water-heaters compliances with the provisions of the 2012 IECC and including a Total Building Performance Compliance Certificate(s); provide a code minimum efficiency compliance or COMcheck compliance certificate reports. [IECC 403, 404, 405 & 407]

6. Provide deferred plan submittal on complying with Communication Alarms, Elements and Features as code requires for accessible audible and visual alarms and notification (signs, alarms, strobes, horns, etc.). Please note, this plan review and approval of plans/documents is required before any required secondary life-safety features building permit(s) will be issued by the City and before any of secondary construction can commence. [NFPA 72 & ICC/ANSI 705]

7. All accessible signs including tactile signs shall contain both raised characters and braille, where signs with both visual and raised characters are required, either one sign with both visual and raised characters, or two separate signs, one with visual, and one with raised characters, shall be provided. [ICC/ANSI A117 703.1]

8. Verify all accessible signs including tactile signs shall contain both raised characters and braille, where signs with both visual and raised characters are required, either one sign with both visual and raised characters, or two separate signs, one with visual, and one with raised characters, shall be provided. [ICC/ANSI A117 703.1]

9. All accessible (handicap) restrooms shall be accessible and comply to the minimum spaces, clearances, fixtures, grab bars and surfaces as outlined in the ICC A117.1-2009. Note: Fully accessible water closet stalls shall have fixed side wall grab bars with addition of vertical grab bar 18-inches minimum in length shall be mounted with the bottom of the bar located 39-inches minimum and 41-inches maximum above the floor, and with the center line of the bar located 39-inches minimum and 41-inches maximum from the rear wall. [ICC A117.1-2009, 604.5.1]

10. Comply with Communication Elements and Features as code requires for accessible audible and visual alarms and notification (signs, strobes, horns, etc.). [NFPA 72 & ICC/ANSI A11.7.1]

11. Comply with ADA 2010 Sec.406 for required curb ramps; which shall be addressed on Site Layout Plan/Civil Drawings. Following is an excerpt from 2010 ADA Standards for Accessible Design:

    406.1 General. Curb ramps on accessible routes shall comply with 406, 405.2 through 405.5, and 405.10.

    406.2 Counter Slope. Counter slopes of adjoining gutters and road surfaces immediately adjacent to the curb ramp shall not be steeper than 1:20. The adjacent surfaces at transitions at curb ramps to walks, gutters, and streets shall be at the same level.

    406.3 Sides of Curb Ramps. Where provided, curb ramp flares shall not be steeper than 1:10.

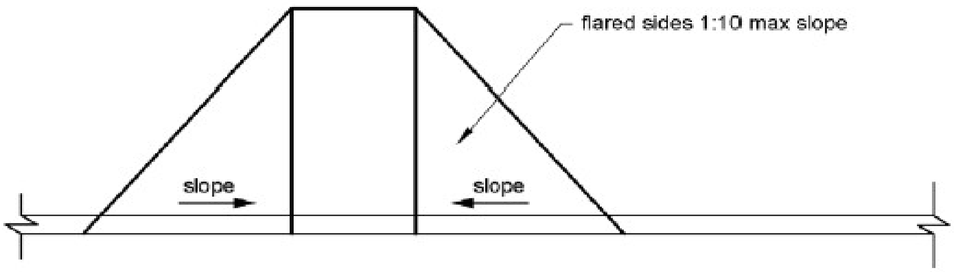


Figure 406.3 Sides of Curb Ramps

<u>406.4 Landings.</u> Landings shall be provided at the tops of curb ramps. The landing clear length shall be 36 inches (915 mm) minimum. The landing clear width shall be at least as wide as the curb ramp, excluding flared sides, leading to the landing.

<u>EXCEPTION:</u> In alterations, where there is no landing at the top of curb ramps, curb ramp flares shall be provided and shall not be steeper than 1:12.

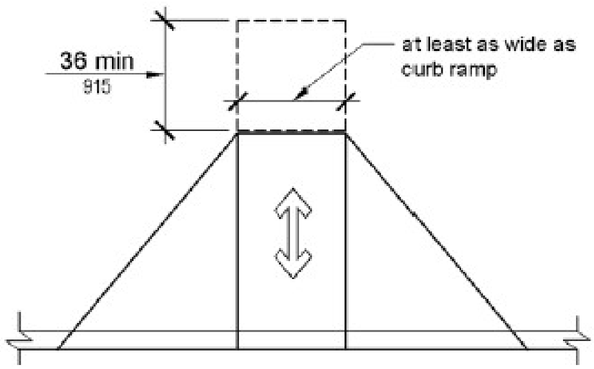


Figure 406.4 Landings at the Top of Curb Ramps

<u>406.5 Location.</u> Curb ramps and the flared sides of curb ramps shall be located so that they do not project into vehicular traffic lanes, parking spaces, or parking access aisles. Curb ramps at marked crossings shall be wholly contained within the markings, excluding any flared sides.

*<u>406.6 Diagonal Curb Ramps</u>**.** Diagonal or corner type curb ramps with returned curbs or other well-defined edges shall have the edges parallel to the direction of pedestrian flow. The bottom of diagonal curb ramps shall have a clear space 48 inches (1220 mm) minimum outside active traffic lanes of the roadway.*

<u>502.2 Vehicle Spaces.</u> Car parking spaces shall be 96 inches (2440 mm) wide minimum and van parking spaces shall be 132 inches (3350 mm) wide minimum, shall be marked to define the width, and shall have an adjacent access aisle complying with 502.3.

<u>EXCEPTION:</u> Van parking spaces shall be permitted to be 96 inches (2440 mm) wide minimum where the access aisle is 96 inches (2440 mm) wide minimum.

12. Parking spaces shall have at least one van accessible parking space per code. [IBC 1106.5 & ADA] The following is an excerpt from ADA Standards for Accessible Parking Spaces Design:

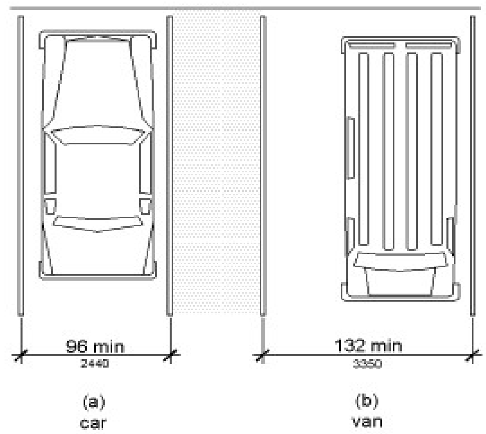


Figure 502.2 Vehicle Parking Spaces

502.3 Access Aisle. Access aisles serving parking spaces shall comply with 502.3. Access aisles shall adjoin an accessible route. Two parking spaces shall be permitted to share a common access aisle.

502.3.1 Width. Access aisles serving car and van parking spaces shall be 60 inches (1525 mm) wide minimum.

502.3.2 Length. Access aisles shall extend the full length of the parking spaces they serve.

502.3.3 Marking. Access aisles shall be marked so as to discourage parking in them.

STRUCTURAL COMMENTS

13. Provide the code required structural calculations and load designs to verify compliance with the required design loads along with being cross reference with the building plans/drawings and details of ***all*** building design components. [IBC 1603]
    - Calculations should clarify lateral *(wind/seismic)* load transfer from roof diaphragm to interior and exterior shear walls below in transverse direction (parallel to roof trusses). And provide all necessary details on the Structural plans including code listed fasteners, connections hardware straps and clips.
    - Calculations should clarify the code applicable internal pressure coefficient and components and cladding design wind pressure to be used for the design of external components. Also show in Seismic Load Data all parameters and coefficients along with verify R factor.
    - Calculations should provide information that relates to all loads of the exterior walls to be indicated as shear wall types along with details and nailing requirements (edge and field) and noted on the Structural plans.
14. Structural plans show pre-manufactured floor and roof trusses. Please provide pre-manufactured roof truss drawings, details and calculations to verify compliance with design loads to the structural provisions OR note as a deferred submittal on the plans.

15. Verify an accurate and complete listing of any required special inspections pursuant to the current code and have the City Building Official approval of the special engineering inspection firm before this project commences. [IBC 1704 & 1705]

MECHANICAL & PLUMBING COMMENTS

16. Clarify on plans that all motors one horsepower or larger shall be specified to be high efficiency type with full load efficiencies equal to or greater than those recommended by ASHRAE /IESNA Standard 90.1.

17. Comply with code for duct classification, which shall be specified for all air ducts. Classification of air ducts shall be based on their maximum operating pressure at pressures of positive or negative. [IMC 603.3]

18. Smoke detectors are required in return air system with a design capacity greater than 2,000 cfm in the return air duct or plenum upstream of any filters, exhaust air connections, outdoor air connections, or decontamination equipment and appliances. [IMC 606.2.1]

19. Verify/provide mechanical ventilation in Restrooms; at least three (3) square feet (0.27 m2) in area; a vertical duct not less than one hundred (100) square inches (0.064 m2) in area for the first toilet facility, with fifty (50) additional square inches (0.032 m2) for additional facility; or a mechanically operated exhaust system capable of exhausting fifty (50) cubic feet of air per minute (23.6 L/x) for each water closet or urinal installed in the toilet room. Such system shall be connected directly to the outside, and the point of discharge shall be at least three feet (3') (914 mm) from any openable window. [IBC 1203.1.3.1]

20. All motors one horsepower or larger shall be specified to be high efficiency type with full load efficiencies equal to or greater than those recommended by ASHRAE /IESNA Standard 90.1.

21. Comply with code for duct classification, which shall be specified for all air ducts. Classification of air ducts shall be based on their maximum operating pressure at pressures of positive or negative. [IMC 603.3]

22. Clarify that all exterior metal gas piping shall be listed/tested with protection coating system. [IFGC 403.8]

23. Verify and address the requirements of fuel gas appliances and equipment listing and labeling on plans. [IMC 301.3 & 301.4]

ELECTRICAL COMMENTS

24. Clarify the properly sized grounding electrode conductor(s) to connect the equipment grounding conductor(s) and the grounded conductor(s) to the grounding electrode(s). [NEC 100, 250.26, 250.66 & Table 250.66].

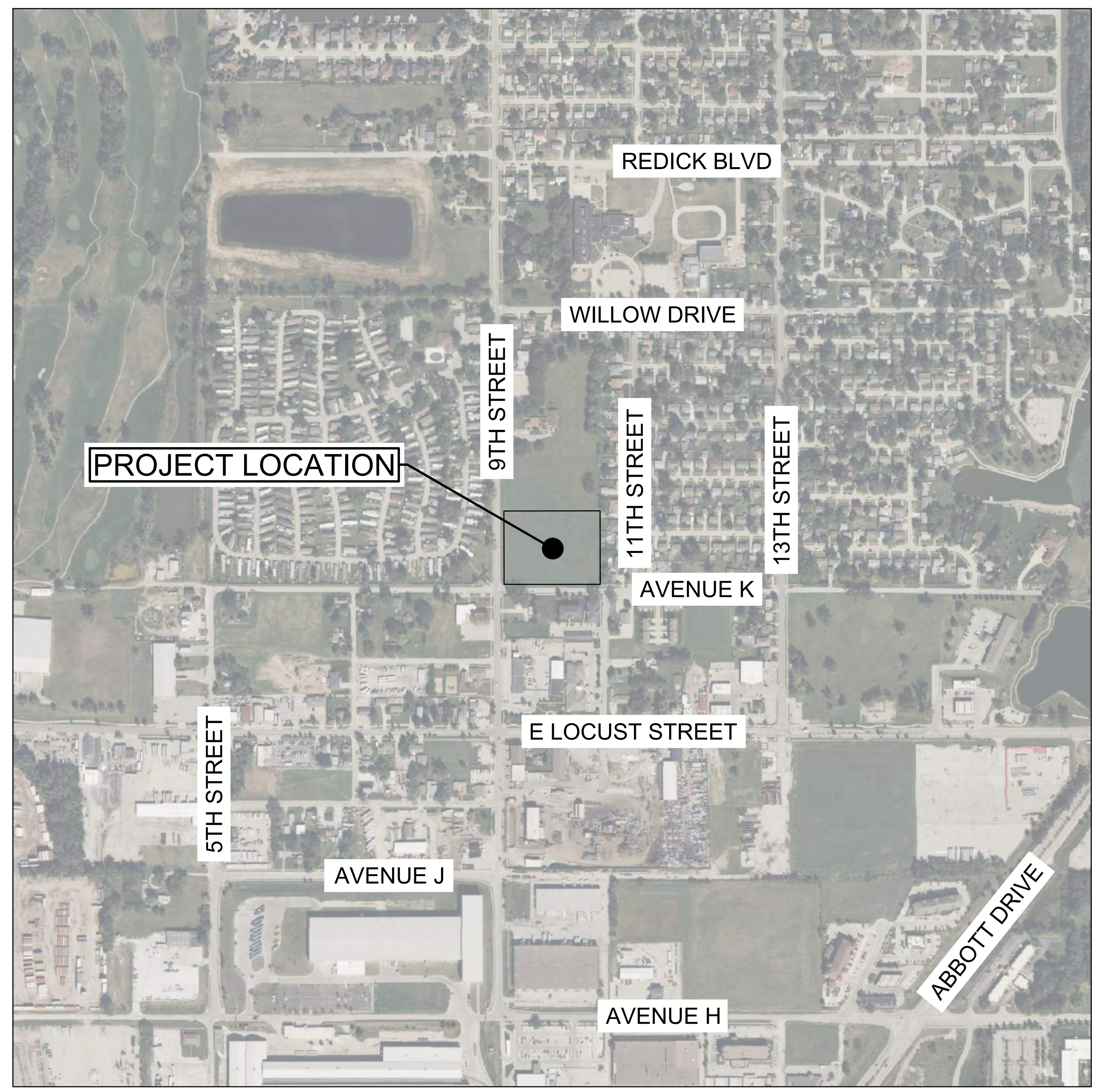
25. Clarify and/or provide code required design of emergency lighting throughout the building. [IBC 1006, 1205.5 & NEC 700]

26. Coordinate with Mechanical Plans and provide code required electrical service receptacle(s) near all equipment, which shall be addressed on the project. [IMC 306.5.2.]

27. Reference exterior lighting for the building; when the power for the exterior lighting is supplied through the energy service to the building, all exterior lighting, other than low voltage lighting, shall have a source efficacy of at least 45 lumens per watt. Fixtures employing lamps rated over 100 watts shall either have a source efficacy of at least 60 lumens per watt or be controlled by a motion sensor. [IECC 505.6]

End of Plan Review Code Comments

SITE PLANS
FOR
THE RESIDENCE AT CARTER LAKE
9TH STREET & AVENUE K
CITY OF CARTER LAKE, POTTAWATTAMIE COUNTY, IOWA



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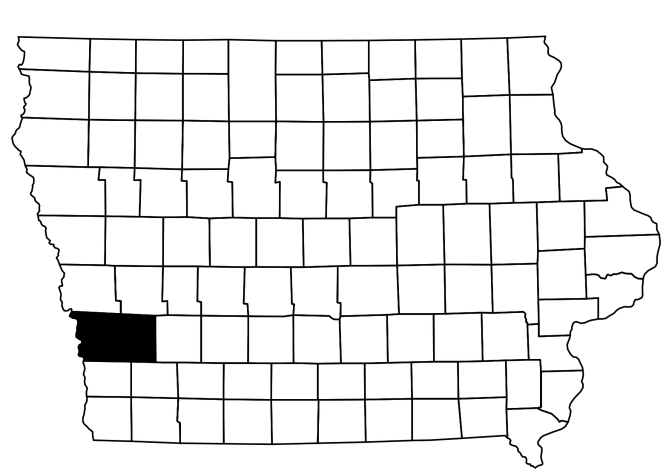
SCALE: 1" = 500'

VICINITY MAP



OWNER / DEVELOPER

AUSTIN KACK
OVERLAND PROPERTY GROUP
5345 W. 151ST TERRACE
LEAWOOD, KS 66224

INDEX OF SHEETS

LICENSED PROFESSIONAL ENGINEER
ELIZABETH A. HUNTER
P18178
IOWA

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.

08/01/2025

Elizabeth A. Hunter, P.E. Date

License Number P18178

My License Renewal Date is December 31, 2026

Pages or sheets covered by this seal:
C1 THRU C12

MARK	REVISION	DATE	BY

Engineer: EDH | Checked By: CHKD | Scale: 1" = 500'
Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21
Project No: 125.0711.10 | Sheet C1

THE RESIDENCE AT CARTER LAKE
CARTER LAKE, IOWA
TITLE

SNYDER & ASSOCIATES, INC.
231 BENNETT AVENUE
COUNCIL BLUFFS, IOWA 51503
712-322-3202 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 125.0711.10
Sheet C1

LEGEND

FEATURES	FOUND	SET
Section Corner		
1/2" Rebar, Cap # 23722 (Unless Otherwise Noted)		
ROW Marker		
ROW Rail		
Control Point		
Bench Mark		
Platted Distance	P	
Measured Bearing & Distance	M	
Recorded As	R	
Deed Distance	D	
Calculated Distance	C	
Minimum Protection Elevation	MPE	
Centerline		
Section Line		
1/4 Section Line		
1/4 1/4 Section Line		
Easement Line		

FEATURES	EXISTING	PROPOSED
Spot Elevation	X (1225.25)	X 1225.25
Contour Elevation	1225	1225
Fence (Barbed, Field, Hog)	X	X
Fence (Chain Link)	//	//
Fence (Wood)		
Fence (Silt)		
Tree Line		
Tree Removal Limits		
Tree Stump		
Deciduous Tree \\ Shrub		
Coniferous Tree \\ Shrub		
Communication	C(*)	C
Overhead Communication	OC(*)	OC
Fiber Optic	FO(*)	FO
Underground Electric	E(*)	E
Overhead Electric	OE(*)	OE
Duct Bank	DUCT(*)	DUCT
Gas Main with Size	G(*)	G
High Pressure Gas Main with Size	HPG(*)	HPG
Water Main with Size	W(*)	W
Sanitary Sewer with Size	S(*)	S
Sanitary Manhole		
Storm Sewer with Size	ST(*)	
Storm Manhole		
Single Storm Sewer Intake		
Double Storm Sewer Intake		

(*) Denotes the survey quality service level for utilities

Fire Hydrant		
Fire Hydrant on Building		
Water Main Valve		
Water Service Valve		
Well		
Utility Pole		
Guy Anchor		
Utility Pole with Light		
Utility Pole with Transformer		
Street Light		
Yard Light		
Electric Box		
Electric Transformer		
Traffic Sign		
Communication Pedestal		
Communication Manhole		
Communication Handhole		
Fiber Optic Manhole		
Fiber Optic Handhole		
Gas Valve		
Gas Manhole		
Gas Apparatus		
Fence Post or Guard Post		
Underground Storage Tank	UST	
Above Ground Storage Tank	AST	
Sign		
Satellite Dish		
Mailbox		
Sprinkler Head	+	+
Irrigation Control Valve	ICV	ICV
Soil Boring	B-2	
Test Hole Location for SUE w/ID		

UTILITY QUALITY SERVICE LEVELS

QUALITY LEVELS OF UTILITIES ARE SHOWN IN THE PARENTHESES WITH THE UTILITY TYPE AND WHEN APPLICABLE, SIZE. THE QUALITY LEVELS ARE BASED ON THE CI / ASCE 38-02 STANDARD.
QUALITY LEVEL (D) INFORMATION IS DERIVED FROM EXISTING UTILITY RECORDS OR ORAL RECOLLECTIONS.
QUALITY LEVEL (C) INFORMATION IS OBTAINED BY SURVEYING AND PLOTTING VISIBLE ABOVE-GROUND UTILITY FEATURES AND USING PROFESSIONAL JUDGMENT IN CORRELATING THIS INFORMATION WITH QUALITY D INFORMATION.
QUALITY LEVEL (B) INFORMATION IS OBTAINED THROUGH THE APPLICATION OF APPROPRIATE SURFACE GEOPHYSICAL METHODS TO DETERMINE THE EXISTENCE AND APPROXIMATE HORIZONTAL POSITION OF SUBSURFACE UTILITIES.
QUALITY LEVEL (A) IS HORIZONTAL AND VERTICAL POSITION OF UNDERGROUND UTILITIES OBTAINED BY ACTUAL EXPOSURE OR VERIFICATION OF PREVIOUSLY EXPOSED SUBSURFACE UTILITIES, AS WELL AS THE TYPE, SIZE, CONDITION, MATERIAL, AND OTHER CHARACTERISTICS.

UTILITY WARNING

THE UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND/OR RECORDS OBTAINED. THE SURVEYOR MAKES NO GUARANTEE THAT THE UTILITIES OR SUBSURFACE FEATURES SHOWN COMPRISE ALL SUCH ITEMS IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UTILITIES OR SUBSURFACE FEATURES SHOWN ARE IN THE EXACT LOCATION INDICATED EXCEPT WHERE NOTED AS QUALITY LEVEL A.

GENERAL NOTES

1. NOTIFY UTILITY PROVIDERS PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES AND COORDINATE WITH UTILITY PROVIDERS AS NECESSARY DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXISTENCE, EXACT LOCATION, AND DEPTH OF ALL UTILITIES. PROTECT ALL UTILITY LINES AND STRUCTURES NOT SHOWN FOR REMOVAL OR MODIFICATION. ANY DAMAGES TO UTILITY ITEMS NOT SHOWN FOR REMOVAL OR MODIFICATION SHALL BE REPAIRED TO THE UTILITY OWNER'S SPECIFICATIONS AT THE CONTRACTOR'S EXPENSE.
2. CONSTRUCTION OF ALL STREET AND UTILITY IMPROVEMENTS SHALL CONFORM TO THE URBAN STANDARD SPECIFICATIONS FOR PUBLIC IMPROVEMENTS AND METROPOLITAN UTILITIES DISTRICT (MUD) STANDARD SPECIFICATIONS AND THE SOILS REPORTS PREPARED BY OTHERS.
3. LENGTH OF UTILITIES SHOWN ON PLANS ARE DIMENSIONED FROM CENTERLINE OF STRUCTURE TO CENTERLINE OF STRUCTURE.
4. ALL TRAFFIC CONTROL SHALL BE PROVIDED IN ACCORDANCE WITH REQUIREMENTS SET FORTH IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). WHEN CONSTRUCTION ACTIVITIES OBSTRUCT PORTIONS OF THE ROADWAY, FLAGGERS SHALL BE PROVIDED. FLAGGERS SHALL CONFORM TO THE MUTCD IN APPEARANCE, EQUIPMENT AND ACTIONS.
5. NOTIFY OWNER, ENGINEER, METROPOLITAN UTILITIES DISTRICT, AND CARTER LAKE PUBLIC WORKS AT LEAST 48 HOURS PRIOR TO BEGINNING WORK.
6. CONSTRUCT MANHOLES AND APPURTENANCES AS WORK PROGRESSES. BACKFILL WITH SUITABLE MATERIAL AND COMPACT TO 95% MAXIMUM DENSITY.
7. IN THE EVENT OF A DISCREPANCY BETWEEN THE QUANTITY ESTIMATES AND THE DETAILED PLANS, THE DETAILED PLANS SHALL GOVERN.
8. ALL FIELD TILES ENCOUNTERED DURING CONSTRUCTION SHALL BE RECONNECTED AND NOTED ACCORDINGLY ON THE AS-BUILT DOCUMENTS.
9. DIMENSIONS, BUILDING LOCATION, UTILITIES AND GRADING OF THIS SITE ARE BASED ON AVAILABLE INFORMATION AT THE TIME OF DESIGN. DEVIATIONS MAY BE NECESSARY IN THE FIELD. ANY SUCH CHANGES OR CONFLICTS BETWEEN THIS PLAN AND FIELD CONDITIONS ARE TO BE REPORTED TO THE ARCHITECT/ENGINEER PRIOR TO STARTING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LAYOUT VERIFICATION OF ALL SITE IMPROVEMENTS PRIOR TO CONSTRUCTION.
10. CONTRACTOR TO LOAD AND TRANSPORT ALL MATERIALS CONSIDERED TO BE UNDESIRABLE TO BE INCORPORATED INTO THE PROJECT TO AN APPROVED OFF-SITE WASTE SITE.
11. CONTRACTOR TO STRIP AND STOCKPILE TOPSOIL FROM ALL AREAS TO BE CUT OR FILLED. RESPREAD TO MINIMUM 6" DEPTH TO FINISH GRADES.
12. ALL PROPOSED CONTOURS AND SPOT ELEVATIONS SHOWN ARE FINISHED GRADES AND/OR TOP OF PAVING SLAB (GUTTER), UNLESS OTHERWISE NOTED.
13. THE CONTRACTOR IS RESPONSIBLE FOR CLEANING DIRT AND DEBRIS FROM NEIGHBORING STREETS, DRIVEWAYS, AND SIDEWALKS CAUSED BY CONSTRUCTION ACTIVITIES IN A TIMELY MANNER.
14. THE ADJUSTMENT OF ANY EXISTING UTILITY APPURTENANCES TO FINAL GRADE IS CONSIDERED INCIDENTAL TO THE SITE WORK.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING EROSION CONTROL MEASURES AS NECESSARY. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR MAINTAINING ANY EXISTING EROSION CONTROL MEASURES ON SITE AT THE TIME OF CONSTRUCTION. GRADING AND SOIL EROSION CONTROL CODE REQUIREMENTS SHALL BE MET BY CONTRACTOR. A GRADING PERMIT IS REQUIRED FOR THIS PROJECT.
16. CONTRACTOR TO COORDINATE NATURAL GAS, ELECTRICAL, TELEPHONE AND ANY OTHER FRANCHISE UTILITY SERVICES WITH UTILITY SERVICE PROVIDER, CARTER LAKE, AND THE OWNER PRIOR TO CONSTRUCTION.
17. CONTRACTOR TO VERIFY ALL UTILITY CROSSINGS AND MAINTAIN MINIMUM 18" VERTICAL AND HORIZONTAL CLEARANCE BETWEEN UTILITIES. CONTRACTOR TO COORDINATE UTILITY ROUTING TO BUILDING AND VERIFY CONNECTION LOCATIONS AND INVERTS PRIOR TO CONSTRUCTION.

NOTES

1. BUILDING LINES AND CORNERS ARE FOR USE IN PREPARING CIVIL SITE PLAN DOCUMENTS. BUILDING CORNERS AND BUILDING LINES SHOULD BE SPECIFICALLY VERIFIED, AS NECESSARY, PRIOR TO DESIGN FOR CONSTRUCTION OF ANY PROPOSED EXPANSION OR CONNECTION OF BUILDING COMPONENTS.
2. FOR CLARITY PURPOSES, SURVEY SPOT ELEVATIONS ARE NOT SHOWN ON THIS SURVEY, BUT ARE CONTAINED WITHIN THE DIGITAL CADD FILES.
3. FOR THE PURPOSE OF THIS SURVEY, STORM SEWER, SANITARY SEWER AND WATER MAIN LINES ARE ASSUMED TO FOLLOW A STRAIGHT LINE FROM STRUCTURE TO STRUCTURE.
4. UTILITY SERVICE LINES TO BUILDINGS ARE APPROXIMATE ONLY. AN INTERNAL BUILDING INVESTIGATION, EXCAVATION AND/OR SUBSURFACE LOCATING/DESIGNATING WOULD NEED TO BE PERFORMED TO DETERMINE THE LOCATION OF SERVICES ENTERING THE BUILDING.
5. UNDERGROUND PIPE MATERIALS AND SIZES ARE BASED UPON VISIBLE EVIDENCE VIEWED FROM ACCESS MANHOLES/STRUCTURES. DUE TO THE CONFIGURATION AND/OR CONSTRUCTION OF THE STRUCTURE, IT MAY BE DIFFICULT TO ACCURATELY DETERMINE THE PIPE MATERIAL AND/OR SIZE. THE SURVEYOR WILL USE THEIR JUDGMENT AND EXPERIENCE TO ATTEMPT TO DETERMINE, BUT COMPLETE ACCURACY CANNOT BE GUARANTEED.
6. BOUNDARY LINES SHOWN ON THE EXISTING SITE SURVEY ARE TO FACILITATE DESIGN OR CONCEPT NEEDS AND ENABLE CREATION OF SAID CONSTRUCTION DOCUMENTS. THESE LINES DO NOT CONSTITUTE A CERTIFIED BOUNDARY SURVEY AND MISSING MONUMENTS WILL NOT BE SET.

PROPERTY ADDRESS

LOCATED AT THE NORTHEAST CORNER OF 9TH STREET AND AVENUE K

ZONING

R-2, URBAN RESIDENTIAL MIXED DENSITY DISTRICT

BULK REGULATIONS

FRONT YARD SETBACK: 25'
DETACHED SIDE YARD SETBACK: 10'
STREET SIDE YARD SETBACK: 15'
REAR YARD SETBACK: 25'

PARKING REQUIREMENTS

DWELLING, MULTI-FAMILY
2 SPACES PER 1-BEDROOM UNIT
2 SPACES PER 2-BEDROOM UNIT
= 54 UNITS X 2 SPACES = 108 SPACES TOTAL REQUIRED
108 SPACES PROVIDED (102 STALLS + 6 ADA ACCESSIBLE STALLS)

UTILITY CONTACT INFORMATION

UTILITY CONTACT FOR MAPPING INFORMATION SHOWN AS RECEIVED FROM THE IOWA ONE CALL DESIGN REQUEST SYSTEM, TICKET NUMBER 552503660.

(CLC) CARTER LAKE, CITY OF
Company name : CARTER LAKE, CITY OF
Design contact: BOB MCCLOUD
Phone: 4026101069
Email: CLMAINTENANCE@CARTERLAKE-IA.GOV

(COX) COX COMMUNICATIONS
Company name : COX COMMUNICATIONS
Design contact: JEREMY DIXON
Phone: 4052135142
Email: JEREMY.DIXON@COX.COM

(CTLIA01) CENTURYLINK
Company name : CENTURYLINK
Design contact: SADIE HULL
Phone: 9185470147
Email: sadie.hull@lumen.com

(MUD) METROPOLITAN UTILITIES DISTRIC
Company name : METROPOLITAN UTILITIES DISTRIC Design contact: Steve Slezak
Phone: 4025047760
Email: steve_slezak@mudnebr.com

(OPP) OMAHA PUBLIC POWER DISTRICT
Company name : OMAHA PUBLIC POWER DISTRICT Design contact: Gerald J Hakenholz
Phone: 4025525470
Email: ghakenholz@oppd.com

(P17) BLACK HILLS ENGY COUNCIL BLUFF
Company name : BLACK HILLS ENGY COUNCIL BLUFF Design contact: Chris Dewey
Phone: 7125806028
Email: chris.dewey@blackhillscorp.com

CONTROL POINTS

IOWA REGIONAL COORDINATE SYSTEM ZONE 6 (COUNCIL BLUFFS)
NAD83(2011)(EPOCH 2010.00) IARTN DERIVED - US SURVEY FEET

CP1	N=6977803.06 E=16449707.87 Z=979.18 SET 1/2" REBAR WITH RED SNYDER CONTROL CAP (AS SHOWN ON SURVEY)
CP2	N=6977833.78 E=16449220.96 Z=974.84 SET 1/2" REBAR WITH RED SNYDER CONTROL CAP (AS SHOWN ON SURVEY)
CP3	N=6978449.68 E=16449219.89 Z=976.19 SET 1/2" REBAR WITH RED SNYDER CONTROL CAP (AS SHOWN ON SURVEY)
CP4	N=6978513.28 E=16449674.70 Z=976.84 SET 1/2" REBAR WITH RED SNYDER CONTROL CAP (AS SHOWN ON SURVEY)

BENCHMARKS

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88 - GEOID12A)
IARTN DERIVED - US SURVEY FEET

BM500	ELEV=981.08 ARROW HEAD OF FIRE HYDRANT
BM501	ELEV=975.92 CENTER OF NO DUMPING ALUMINUM DISK

DATE OF SURVEY

JUNE 23, 2025

IOWA ONE CALL
1-800-292-8989
www.iowaonecall.com
811 Know what's below. Call before you dig.

MARK	DATE	BY	REVISION

Engineer: EDH | Checked By: CHKD | Scale: 1" = NONE
Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21
Project No: 125.0711.10 | Sheet C2

THE RESIDENCE AT CARTER LAKE

GENERAL INFORMATION

CARTER LAKE, IOWA

SNYDER & ASSOCIATES, INC.
231 BENNETT AVENUE
COUNCIL BLUFFS, IOWA 51503
712-322-3202 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 125.0711.10
Sheet C2

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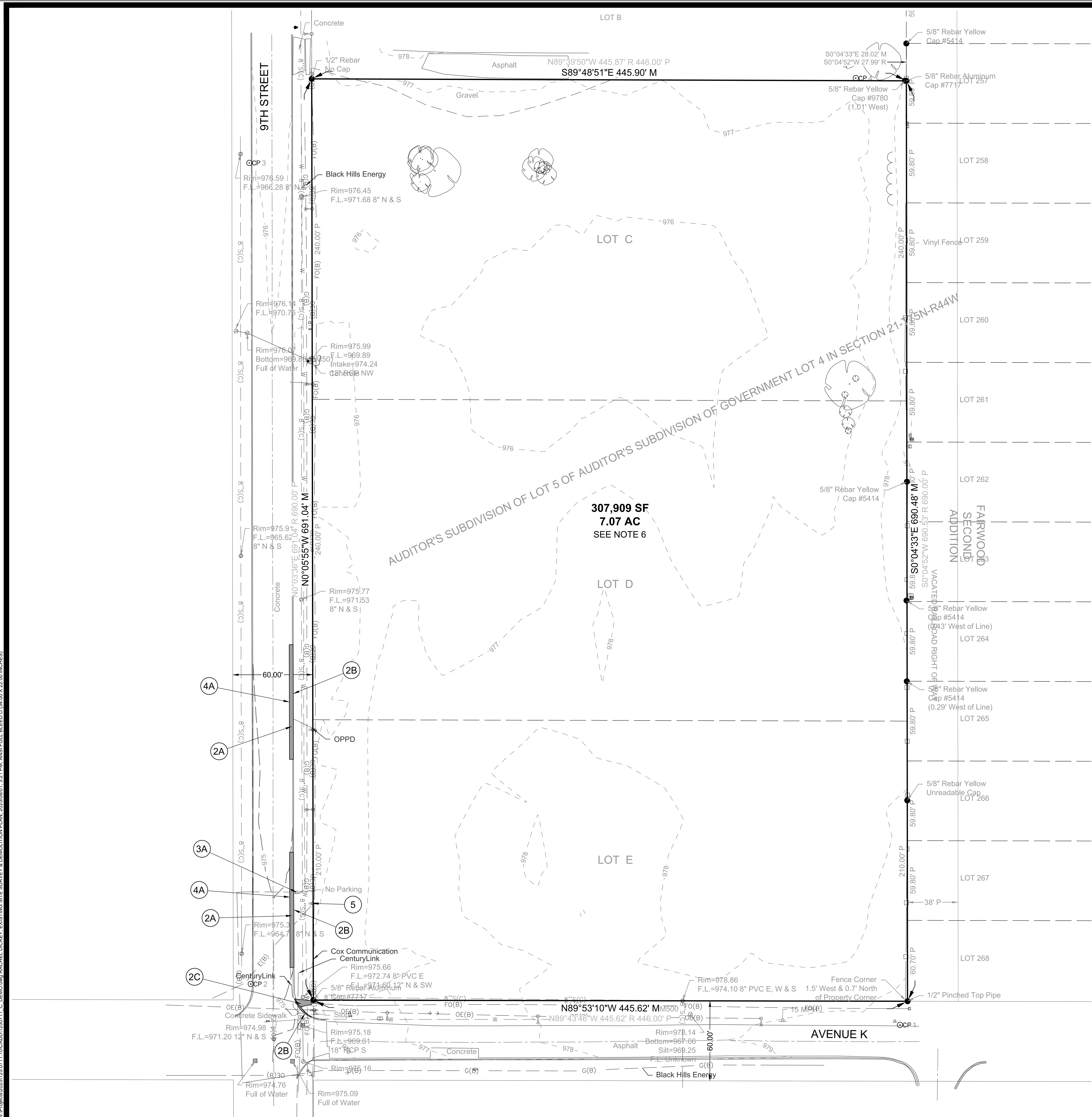
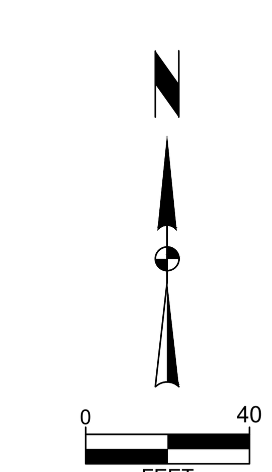


DEMOLITION PLAN NOTES

1. EXISTING FEATURES, PROTECT THE FOLLOWING:
   A. PAVEMENT TO REMAIN.
   B. EXISTING UTILITIES. COORDINATE ANY RELOCATIONS OR ADJUSTMENTS WITH UTILITY SERVICE PROVIDER AS NECESSARY.
2. REMOVAL AND DISPOSAL OF THE FOLLOWING:
   A. PCC PAVEMENT.
   B. CURB.
   C. PCC SIDEWALK RAMP.
3. REMOVAL AND REPLACEMENT OF THE FOLLOWING:
   A. "NO PARKING" STREET SIGN, COORDINATE NEW LOCATION WITH CITY OF CARTER LAKE.
4. SAWCUT THE FOLLOWING LOCATIONS:
   A. ALONG 9TH STREET.
5. RELOCATION OF 1 POWER POLE TO BE COMPLETED BY OPPD. CONTRACTOR TO COORDINATE AS NEEDED..
6. REFERENCE THE NEW PLAT FOR FINAL INTERIOR LOT LINE LOCATIONS.



MARK	REVISION	DATE	BY

Engineer: EDH | Checked By: CHKD | Scale: 1" = 40'
Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21
Project No: 125.0711.10 | Sheet C3

THE RESIDENCE AT CARTER LAKE

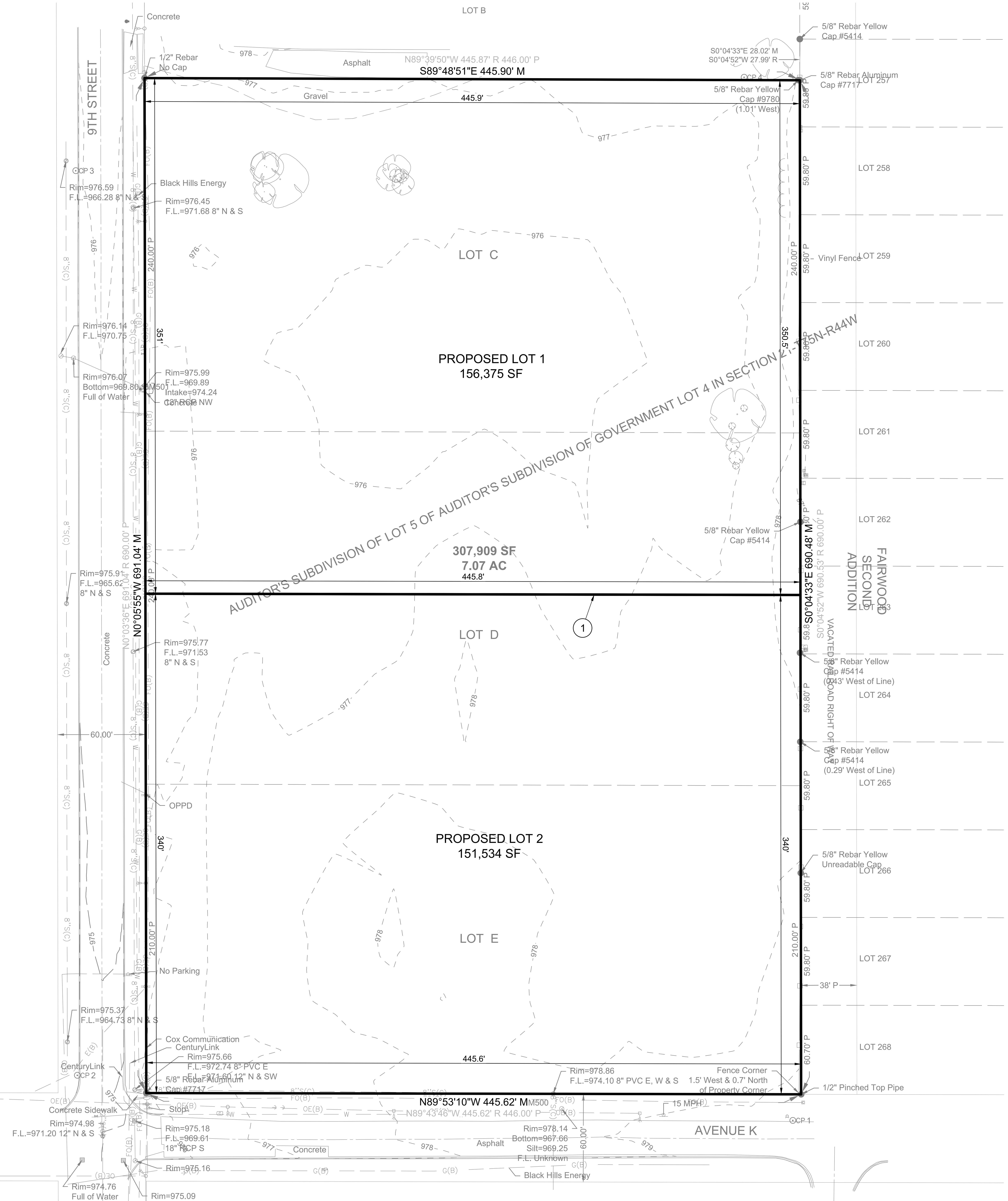
EXISTING SITE SURVEY & DEMOLITION PLAN

CARTER LAKE, IOWA

SNYDER & ASSOCIATES, INC.
231 BENNETT AVENUE
COUNCIL BLUFFS, IOWA 51503
712-322-3202 | www.snyder-associates.com
SNYDER & ASSOCIATES

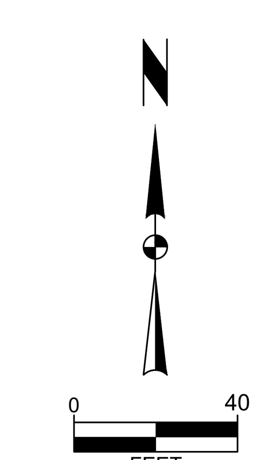
Project No: 125.0711.10

Sheet C3



GENERAL NOTES

1. PROPOSED LOT LINE, REFERENCE THE NEW PLAT FOR FINAL INTERIOR LOT LINE LOCATIONS.



MARK	REVISION	DATE	BY

Engineer: EDH | Checked By: CHKD | Scale: 1" = 40'
Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21
Project No: 125.0711.10 | Sheet C3A

THE RESIDENCE AT CARTER LAKE

CARTER LAKE, IOWA

OVERALL LOT PLAN

SNYDER & ASSOCIATES, INC.

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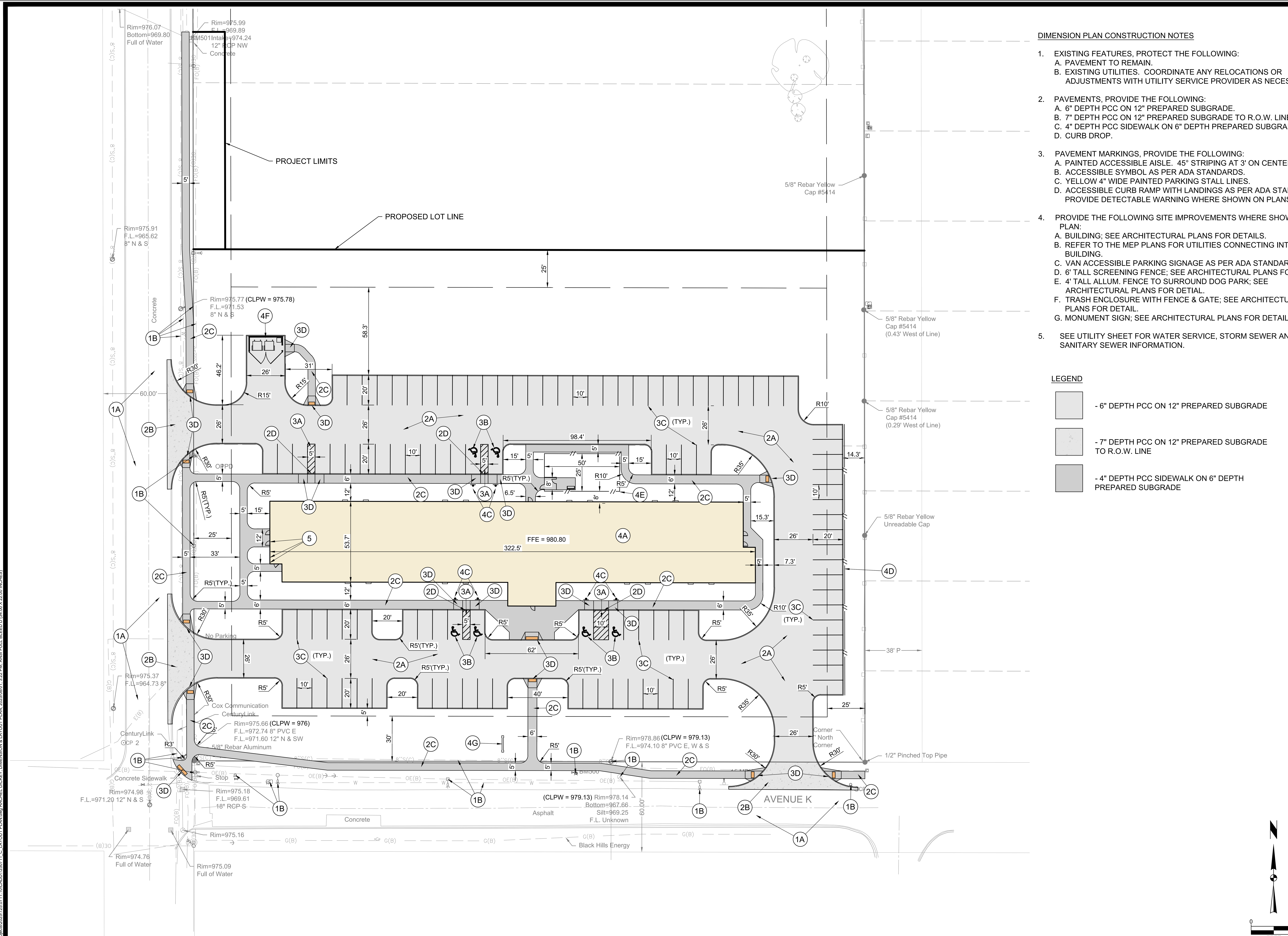
Project No: 125.0711.10

Sheet C3A



DIMENSION PLAN CONSTRUCTION NOTES

1. EXISTING FEATURES, PROTECT THE FOLLOWING:
   A. PAVEMENT TO REMAIN.
   B. EXISTING UTILITIES. COORDINATE ANY RELOCATIONS OR ADJUSTMENTS WITH UTILITY SERVICE PROVIDER AS NECESSARY.
2. PAVEMENTS, PROVIDE THE FOLLOWING:
   A. 6" DEPTH PCC ON 12" PREPARED SUBGRADE.
   B. 7" DEPTH PCC ON 12" PREPARED SUBGRADE TO R.O.W. LINE.
   C. 4" DEPTH PCC SIDEWALK ON 6" DEPTH PREPARED SUBGRADE.
   D. CURB DROP.
3. PAVEMENT MARKINGS, PROVIDE THE FOLLOWING:
   A. PAINTED ACCESSIBLE AISLE. 45° STRIPING AT 3' ON CENTER.
   B. ACCESSIBLE SYMBOL AS PER ADA STANDARDS.
   C. YELLOW 4" WIDE PAINTED PARKING STALL LINES.
   D. ACCESSIBLE CURB RAMP WITH LANDINGS AS PER ADA STANDARDS. PROVIDE DETECTABLE WARNING WHERE SHOWN ON PLANS.
4. PROVIDE THE FOLLOWING SITE IMPROVEMENTS WHERE SHOWN ON PLAN:
   A. BUILDING; SEE ARCHITECTURAL PLANS FOR DETAILS.
   B. REFER TO THE MEP PLANS FOR UTILITIES CONNECTING INTO THE BUILDING.
   C. VAN ACCESSIBLE PARKING SIGNAGE AS PER ADA STANDARDS.
   D. 6' TALL SCREENING FENCE; SEE ARCHITECTURAL PLANS FOR DETAIL.
   E. 4' TALL ALLUM. FENCE TO SURROUND DOG PARK; SEE ARCHITECTURAL PLANS FOR DETAIL.
   F. TRASH ENCLOSURE WITH FENCE & GATE; SEE ARCHITECTURAL PLANS FOR DETAIL.
   G. MONUMENT SIGN; SEE ARCHITECTURAL PLANS FOR DETAIL.
5. SEE UTILITY SHEET FOR WATER SERVICE, STORM SEWER AND SANITARY SEWER INFORMATION.

LEGEND

- 6" DEPTH PCC ON 12" PREPARED SUBGRADE
- 7" DEPTH PCC ON 12" PREPARED SUBGRADE TO R.O.W. LINE
- 4" DEPTH PCC SIDEWALK ON 6" DEPTH PREPARED SUBGRADE

MARK	REVISION	DATE	BY

Engineer: EDH | Checked By: CHKD | Scale: 1" = 30'
Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21
Project No: 125.0711.10 | Sheet C4

THE RESIDENCE AT CARTER LAKE

DIMENSION & LAYOUT PLAN

CARTER LAKE, IOWA

SNYDER & ASSOCIATES, INC.
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COUNCIL BLUFFS, IOWA 51503
712-322-3202 | www.snyder-associates.com

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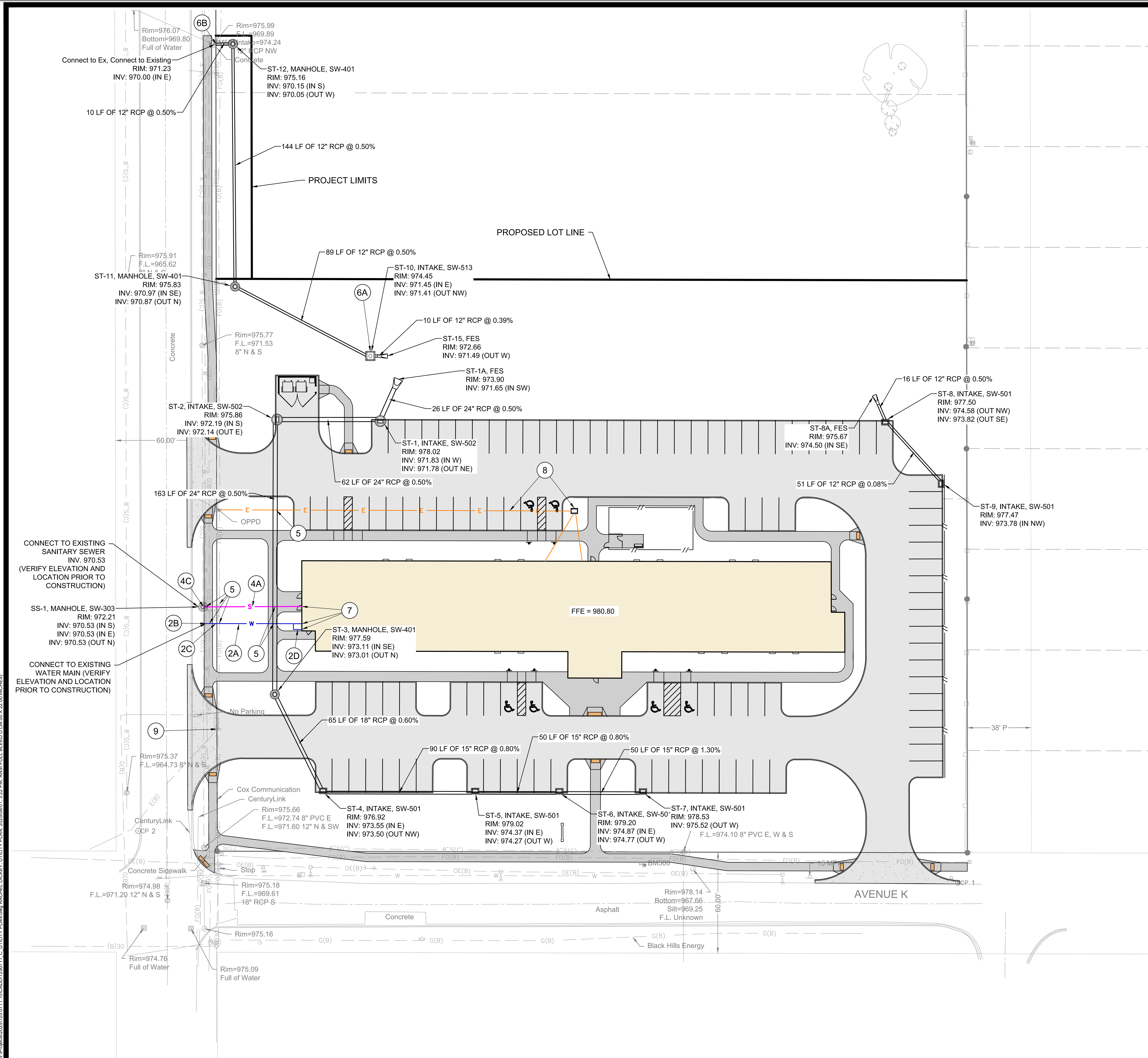
Project No: 125.0711.10

Sheet C4



UTILITY CONSTRUCTION NOTES

1. EXISTING FEATURES, PROTECT THE FOLLOWING:
   A. PROTECT EXISTING UTILITIES.
   B. PROTECT EXISTING PAVEMENTS.
2. WATER SERVICE, PROVIDE THE FOLLOWING:
   A. 3" WATER SERVICE. COORDINATE BUILDING CONNECTION WITH ARCHITECTURAL PLANS. SEE MUD STANDARD 3" SERVICE TAP FOR ADDITIONAL INFORMATION. APPROXIMATELY 57' FROM BUILDING CONNECTION TO WATER MAIN CONNECTION.
   B. CONNECT TO EXISTING WATER MAIN WITH 3" TAPPING VALVE AND SLEEVE. ALL WORK UP TO THE CURB STOP MUST BE COMPLETED WITH MUD INSPECTOR PRESENT. ALL WATER MAIN SHALL BE COMPLETED TO MUD STANDARDS.
   C. CURB STOP AND BOX. SEE MUD STANDARD 3" SERVICE DETAIL FOR ADDITIONAL INFORMATION.
   D. 6" FIRE SERVICE LINE.
3. STORM AND SANITARY IMPROVEMENTS SHALL BE PROVIDED AND INSTALLED PER SUDAS STANDARD SPECIFICATIONS.
4. SANITARY SEWER, PROVIDE THE FOLLOWING:
   A. 8" SANITARY SEWER SERVICE LINE. APPROXIMATELY 58' FROM BUILDING CONNECTION TO EXISTING SANITARY SEWER CONNECTION.
   B. MAINTAIN 18" MINIMUM SEPARATION FROM WATER SERVICE. PLACE SANITARY SERVICE LOWER THAN WATER SERVICE IF POSSIBLE.
   C. CONNECT TO EXISTING 8" SANITARY SEWER WITH SW-303 MANHOLE PER SUDAS STANDARD SPECIFICATIONS SECTION 4010.
5. CRITICAL CROSSING. MAINTAIN 18" MIN. SEPARATION. VERIFY CROSSING WITH EXISTING UTILITIES PRIOR TO CONSTRUCTION.
6. STORM SEWER IMPROVEMENTS, PROVIDE THE FOLLOWING:
   A. SEE SHEET C12 FOR OUTLET STRUCTURE DETAILS.
   B. CONNECT TO EXISTING 8" STORM SEWER MANHOLE. VERIFY LOCATION, DEPTH AND SIZE PRIOR TO CONSTRUCTION.
7. CONNECT SANITARY AND WATER TO BUILDING SERVICE. COORDINATE SIZE, LOCATION, AND ELEVATION WITH MECHANICAL PLANS PRIOR TO CONSTRUCTION.
8. ESTIMATED LOCATION OF ELECTRICAL TRANSFORMER AND CONDUIT LINES, FINAL LOCATION TO BE COORDINATED WITH OPPD.
9. RELOCATION OF 1 POWER POLE TO BE COMPLETED BY OPPD. CONTRACTOR TO COORDINATE AS NEEDED.

LEGEND

W — PROPOSED WATER LINE

S — PROPOSED SEWER LINE

E — PROPOSED FIBER OPTIC LINE

MARK	REVISION	DATE	BY

Engineer: EDH | Checked By: CHKD | Scale: 1" = 30'

Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21

Project No: 125.0711.10 | Sheet C5

THE RESIDENCE AT CARTER LAKE

UTILITY PLAN

CARTER LAKE, IOWA

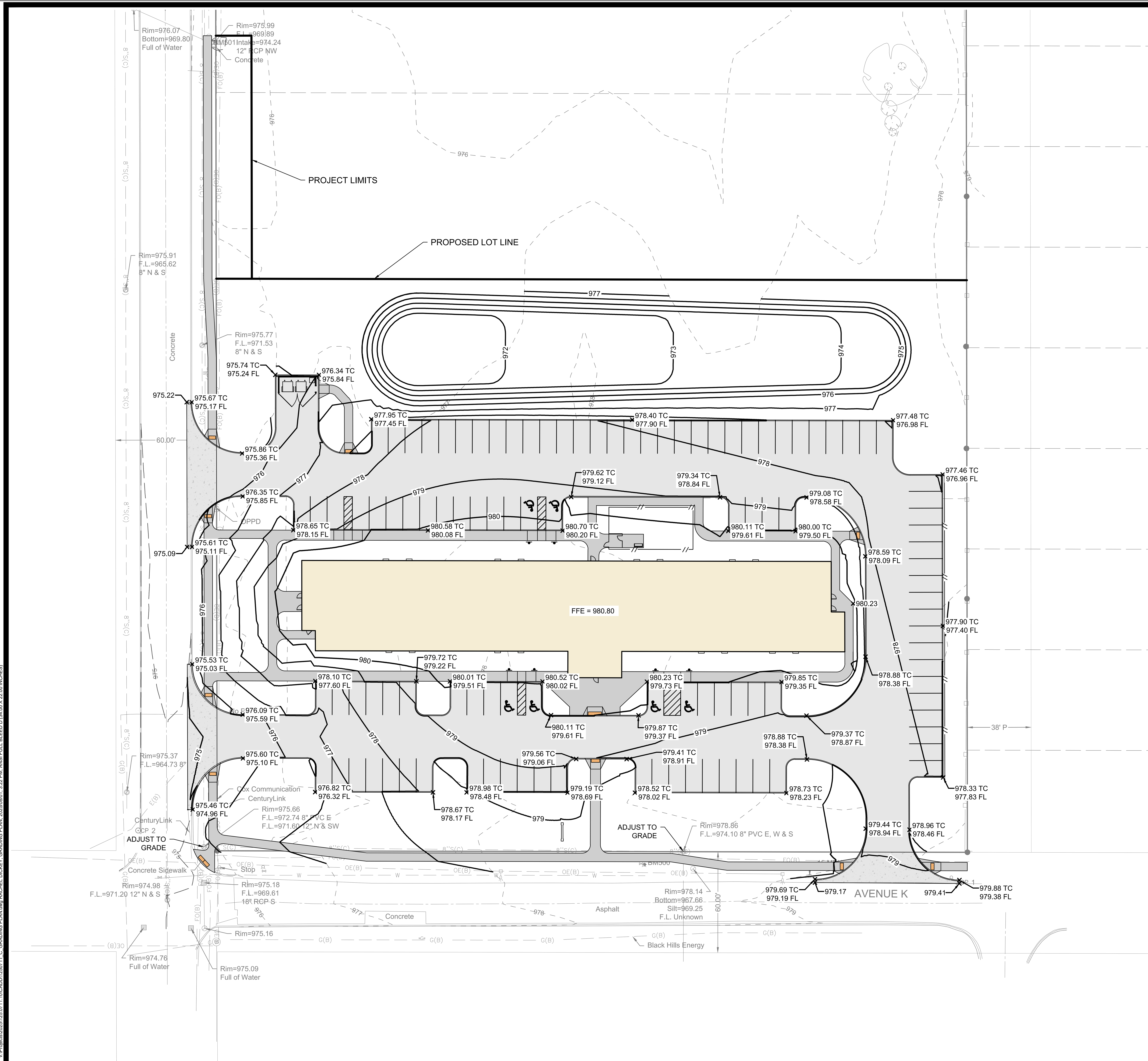
SNYDER & ASSOCIATES, INC.

231 BENNETT AVENUE
COUNCIL BLUFFS, IOWA 51503
712-322-3202 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 125.0711.10

Sheet C5



GRADING PLAN NOTES

1. CONTRACTOR TO STRIP AND STOCKPILE TOPSOIL ON ALL AREAS TO BE CUT OR FILLED. RE-SPREAD TO MINIMUM 6" DEPTH TO FINISH GRADES.
2. ANY EXCESS CUT TO BE SPREAD ON SITE AS DIRECTED BY ENGINEER DURING CONSTRUCTION. PLACE TOPSOIL OVER ALL AREAS DISTURBED.
3. GRADES SHOWN ARE FINISHED GRADE AND/OR TOP OF PAVING SLAB (GUTTER), UNLESS OTHERWISE NOTED.

SPOT ELEVATIONS INDICATE TOP OF SLAB, FINISH FLOOR ELEVATION, OR FINISH GRADE, UNLESS OTHERWISE NOTED.
TC= TOP OF CURB
FL= FLOW LINE
FFE= FINISHED FLOOR ELEVATION

MARK	REVISION	DATE	BY

Engineer: EDH | Checked By: CHKD | Scale: 1" = 30'
Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21
Project No: 125.0711.10 | Sheet C6

THE RESIDENCE AT CARTER LAKE

GRADING PLAN

CARTER LAKE, IOWA

SNYDER & ASSOCIATES, INC.
231 BENNETT AVENUE
COUNCIL BLUFFS, IOWA 51503
712-322-3202 | www.snyder-associates.com

SNYDER & ASSOCIATES

Project No: 125.0711.10

Sheet C6

MAINTENANCE SCHEDULE

THE FOLLOWING MAINTENANCE SCHEDULE HAS BEEN PROVIDED. THE INSPECTOR MUST PERFORM THE INSPECTIONS. THE OPERATOR/CONTRACTOR MUST PERFORM ALL NEEDED MAINTENANCE. FURTHERMORE, ALL EROSION CONTROL FEATURE REQUIRING MAINTENANCE MAY NOT BE LISTED BELOW. THE OPERATOR/CONTRACTOR AND INSPECTOR MUST PERFORM THEIR RESPECTIVE DUTIES ON ALL BMP'S THAT ARE NOT LISTED BELOW AS WELL.

1. CONSTRUCTION ENTRANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE OR THE WASHING AND REWORKING OF EXISTING STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY STRUCTURES USED TO TRAP SEDIMENT. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY. THE USE OF WATER TRUCKS TO REMOVE MATERIALS DROPPED, WASHED, OR TRACKED ONTO ROADWAYS WILL NOT BE PERMITTED UNDER ANY CIRCUMSTANCES.
2. STRAW BALE BARRIER - THE MAINTENANCE MEASURES ARE AS FOLLOWS: (2.1) STRAW BALE BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL; (2.2) CLOSE ATTENTION SHALL BE PAID TO THE REPAIR OF DAMAGED BALES, END RUNS AND UNDERCUTTING BENEATH BALES; (2.3) NECESSARY REPAIRS TO BARRIERS OR REPLACEMENT OF BALES SHALL BE ACCOMPLISHED PROMPTLY; (2.4) SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH RAINFALL, THEY MUST BE REMOVED WHEN THE LEVEL OF DEPOSITION REACHES APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER; AND (2.5) ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE STRAW BALE BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.
3. SILT FENCE - THE MAINTENANCE MEASURES ARE AS FOLLOWS: (3.1) SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL, ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY; (3.2) CLOSE ATTENTION SHALL BE PAID TO THE REPAIR OF DAMAGED SILT FENCE RESULTING FROM END RUNS AND UNDERCUTTING; (3.3) SHOULD THE FABRIC ON A SILT FENCE DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER IS STILL NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY; (3.4) SEDIMENT DEPOSITS MUST BE REMOVED WHEN THE LEVEL OF DEPOSITION REACHES APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER; AND (3.5) ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.
4. STORM DRAIN INLET PROTECTION - THE MAINTENANCE MEASURES ARE AS FOLLOWS: (4.1) STRUCTURES SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NECESSARY AND (4.2) STRUCTURES SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
5. TEMPORARY DIVERSION DIKE - THE MEASURE SHALL BE INSPECTED AFTER EVERY STORM AND REPAIRS MADE TO THE DIKE, FLOW CHANNEL, OUTLET OR SEDIMENT TRAPPING FACILITY, AS NECESSARY. ONCE EVERY TWO WEEKS, WHETHER A STORM EVENT HAS OCCURRED OR NOT, THE MEASURE SHALL BE INSPECTED AND REPAIRS MADE IF NEEDED. DAMAGES CAUSED BY CONSTRUCTION TRAFFIC OR OTHER ACTIVITY MUST BE REPAIRED BEFORE THE END OF EACH WORKING DAY.
6. TEMPORARY FILL DIVERSION - SINCE THE PRACTICE IS TEMPORARY AND UNDER MOST SITUATIONS WILL BE COVERED THE NEXT WORKING DAY. THE MAINTENANCE REQUIRED SHOULD BE LOW. IF THE PRACTICE IS TO REMAIN IN USE FOR MORE THAN ONE DAY, AN INSPECTION SHALL BE MADE AT THE END OF EACH WORK DAY AND REPAIRS MADE TO THE MEASURE IF NEEDED. THE OPERATOR/CONTRACTOR SHOULD AVOID THE PLACEMENT OF ANY MATERIAL OVER THE STRUCTURE WHILE IT IS IN USE. CONSTRUCTION TRAFFIC SHOULD NOT BE PERMITTED TO CROSS THE DIVERSION.
7. TEMPORARY SEDIMENT TRAP - THE MAINTENANCE MEASURES ARE AS FOLLOWS: (7.1) SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN VOLUME OF THE WET STORAGE, SEDIMENT REMOVAL FROM THE BASIN SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE AND CAUSE SEDIMENTATION PROBLEMS; (7.2) FILTER STONE SHALL BE REGULARLY CHECKED TO ENSURE THAT FILTRATION PERFORMANCE IS MAINTAINED, STONE CHOKED WITH SEDIMENT SHALL BE REMOVED AND CLEANED OR REPLACED; AND (7.3) THE STRUCTURE SHOULD BE CHECKED REGULARLY TO ENSURE THAT IT IS STRUCTURALLY SOUND AND HAS NOT BEEN DAMAGED BY EROSION OR CONSTRUCTION EQUIPMENT, THE HEIGHT OF THE STONE OUTLET SHOULD BE CHECKED TO ENSURE THAT ITS CENTER IS AT LEAST 1 FOOT BELOW THE TOP OF THE EMBANKMENT.
8. TEMPORARY SEDIMENT BASIN - THE BASIN EMBANKMENT SHOULD BE CHECKED REGULARLY TO ENSURE THAT IT IS STRUCTURALLY SOUND AND HAS NOT BEEN DAMAGED BY EROSION OR CONSTRUCTION EQUIPMENT. THE EMERGENCY SPILLWAY SHOULD BE CHECKED REGULARLY TO ENSURE THAT ITS LINING IS WELL ESTABLISHED AND EROSION-RESISTANT. THE BASIN SHOULD BE CHECKED AFTER EACH RUNOFF PRODUCING RAINFALL FOR SEDIMENT CLEANOUT AND TRASH REMOVAL. WHEN THE SEDIMENT REACHES THE CLEANOUT LEVEL, IT SHALL BE REMOVED AND PROPERLY DISPOSED OF.
9. TEMPORARY SEEDING - AREAS WHICH FAIL TO ESTABLISH VEGETATIVE COVER ADEQUATE TO PREVENT RILL EROSION WILL BE RE-SEEDED AS SOON AS SUCH AREAS ARE IDENTIFIED. CONTROL WEEDS BY MOWING.
10. PERMANENT SEEDING - THE MAINTENANCE MEASURES ARE AS FOLLOWS: (10.1) IN GENERAL, A STAND OF VEGETATION CANNOT BE DETERMINED TO BE FULLY ESTABLISHED UNTIL IT HAS BEEN MAINTAINED FOR ONE FULL YEAR AFTER PLANNING; (10.2) NEW SEEDLINGS SHALL BE SUPPLIED WITH ADEQUATE MOISTURE, SUPPLY WATER AS NEEDED, ESPECIALLY LATE IN THE SEASON, IN ABNORMALLY HOT OR DRY CONDITIONS, OR ON ADVERSE SITES, WATER APPLICATIONS SHALL BE CONTROLLED TO PREVENT EXCESSIVE RUNOFF; (10.3) INSPECT ALL SEEDED AREAS FOR FAILURES AND MAKE NECESSARY REPAIRS, REPLACEMENTS, AND RESEEDINGS WITHIN THE PLANTING SEASON, IF POSSIBLE; [10.3.A] IF STAND IS INADEQUATE FOR EROSION CONTROL, OVER SEED AND FERTILIZE USING HALF OF THE RATES ORIGINALLY SPECIFIED; [10.3.B] IF STAND IS 60% DAMAGED, RE-ESTABLISH FOLLOWING SEEDBED AND SEEDING RECOMMENDATIONS; [10.3.C] IF STAND HAS LESS THAN 40% COVER, RE-EVALUATE CHOICE OF PLANT MATERIALS AND QUANTITIES OF LIME AND FERTILIZER, THE SOIL MUST BE TESTED TO DETERMINE IF ACIDITY OR NUTRIENT IMBALANCES ARE RESPONSIBLE, RE-ESTABLISH THE STAND FOLLOWING SEEDBED AND SEEDING RECOMMENDATIONS.
11. MULCHING - ALL MULCHES AND SOIL COVERINGS SHOULD BE INSPECTED PERIODICALLY (PARTICULARLY AFTER RAINSTORMS) TO CHECK FOR EROSION. WHERE EROSION IS OBSERVED IN MULCHED AREAS, ADDITIONAL MULCH SHOULD BE APPLIED. NETS AND MATS SHOULD BE INSPECTED AFTER RAINSTORMS FOR DISLOCATION OR FAILURE. IF WASHOUTS OR BREAKAGE OCCUR, REINSTALL NETTING OR MATTING AS NECESSARY AFTER REPAIRING DAMAGE TO THE SLOPE OR DITCH. INSPECTIONS SHOULD TAKE PLACE UNTIL GRASSES ARE FIRMLY ESTABLISHED. WHERE MULCH IS USED IN CONJUNCTION WITH ORNAMENTAL PLANTINGS, INSPECT PERIODICALLY THROUGHOUT THE YEAR TO DETERMINE IF MULCH IS MAINTAINING COVERAGE OF THE SOIL SURFACE; REPAIR AS NEEDED.
12. SOIL STABILIZATION BLANKETS & MATTING - ALL SOIL STABILIZATION BLANKETS AND MATTING SHOULD BE INSPECTED PERIODICALLY FOLLOWING INSTALLATION, PARTICULARLY AFTER RAINSTORMS TO CHECK FOR EROSION AND UNDERMINING. ANY DISLOCATION OR FAILURE SHOULD BE REPAIRED IMMEDIATELY. IF WASHOUTS OR BREAKAGE OCCURS, REINSTALL THE MATERIAL AFTER REPAIRING DAMAGE TO THE SLOPE OR DITCH. CONTINUE TO MONITOR THESE AREAS UNTIL WHICH TIME THEY BECOME PERMANENTLY STABILIZED; AT THAT TIME AN ANNUAL INSPECTIONS SHOULD BE ADEQUATE.
13. STREET CLEANING / SWEEPING - THE MAINTENANCE MEASURES ARE AS FOLLOWS: (13.1) EVALUATE ACCESS POINTS DAILY FOR SEDIMENT TRACKING; (13.2) WHEN TRACKED OR SPILLED SEDIMENT IS FOUND ON PAVED SURFACES, IT WILL BE REMOVED DAILY, DURING TIMES OF HEAVY TRACK-OUT, SUCH AS DURING RAINS, CLEANING MAY BE DONE SEVERAL TIMES THROUGHOUT THE DAY; (13.3) UNKNOWN SPILLS OR OBJECTS WILL NOT BE MIXED WITH THE SEDIMENT; AND (13.4) IF SEDIMENT IS MIXED WITH OTHER POLLUTANTS, IT WILL BE DISPOSED OF PROPERLY AT AN AUTHORIZED LANDFILL.

CONSTRUCTION ACTIVITIES & SCHEDULING

ACTIVITY	SCHEDULE
INSTALL ALL BMP'S NEEDED AND ASSOCIATED WITH THE GRADING PHASE SUCH AS STABILIZED CONSTRUCTION ENTRANCES, SILT BASINS, RISER PIPES, OUTLET PIPES, SILT TRAPS, SILT FENCE, DIVERSIONS, TERRACES, AND ETCETERA.	PRIOR TO ANY STRIPPING OF EXISTING VEGETATION OR GRADING.
PROCEED WITH STRIPPING OF EXISTING VEGETATION AND GRADING IN ACCORDANCE WITH THE GRADING PLAN, WHILE DISTURBING NO MORE THAN NECESSARY.	AFTER INSTALLING ALL BMP'S NEEDED AND ASSOCIATED WITH THE GRADING PHASE. FURTHERMORE, INSPECTOR APPROVAL MUST BE OBTAINED BEFORE THE START OF ANY STRIPPING OF EXISTING VEGETATION OR GRADING.
PROCEED WITH INFRASTRUCTURE INSTALLATION.	INFRASTRUCTURE INSTALLATION MUST OCCUR PRIOR TO ANY LOT DEVELOPMENT.
IMPLEMENT THE INSTALLATION OF PERMANENT SEEDING, AND/OR MULCHING, MATTING.	STABILIZATION MEASURES MUST BE INITIATED AS SOON AS POSSIBLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED.
IMPLEMENT THE INSTALLATION ALL BMP'S NEEDED AND ASSOCIATED WITH THE BUILDING PHASE.	BUILDING PHASE BMP'S MUST BE INSTALLED CONCURRENTLY WITH LOT DEVELOPMENT.
PROCEED WITH REMOVAL OF BMP'S.	BMP'S MAY NOT BE REMOVED UNTIL EACH IMPACTED DRAINAGE BASIN HAS BEEN FULLY DEVELOPED. FULL DEVELOPMENT SHALL MEAN INSTALLATION OF PAVEMENT, BUILDINGS, AND UTILITIES, LANDSCAPING, AND FULLY ESTABLISHED PERMANENT SEEDING. FURTHERMORE, INSPECTOR APPROVAL MUST BE OBTAINED BEFORE THE REMOVAL OF ANY BMP'S.

MARK	REVISION	DATE	BY

Engineer: EDH
Checked By: CHKD
Scale: 1" = ##'
Technician: RMD
Date: 08/01/2025
T-R-S: 75N-44W-21
Project No: 125.0711.10
Sheet C7

THE RESIDENCE AT CARTER LAKE

CARTER LAKE, IOWA

SWPPP NOTES

SNYDER & ASSOCIATES, INC.

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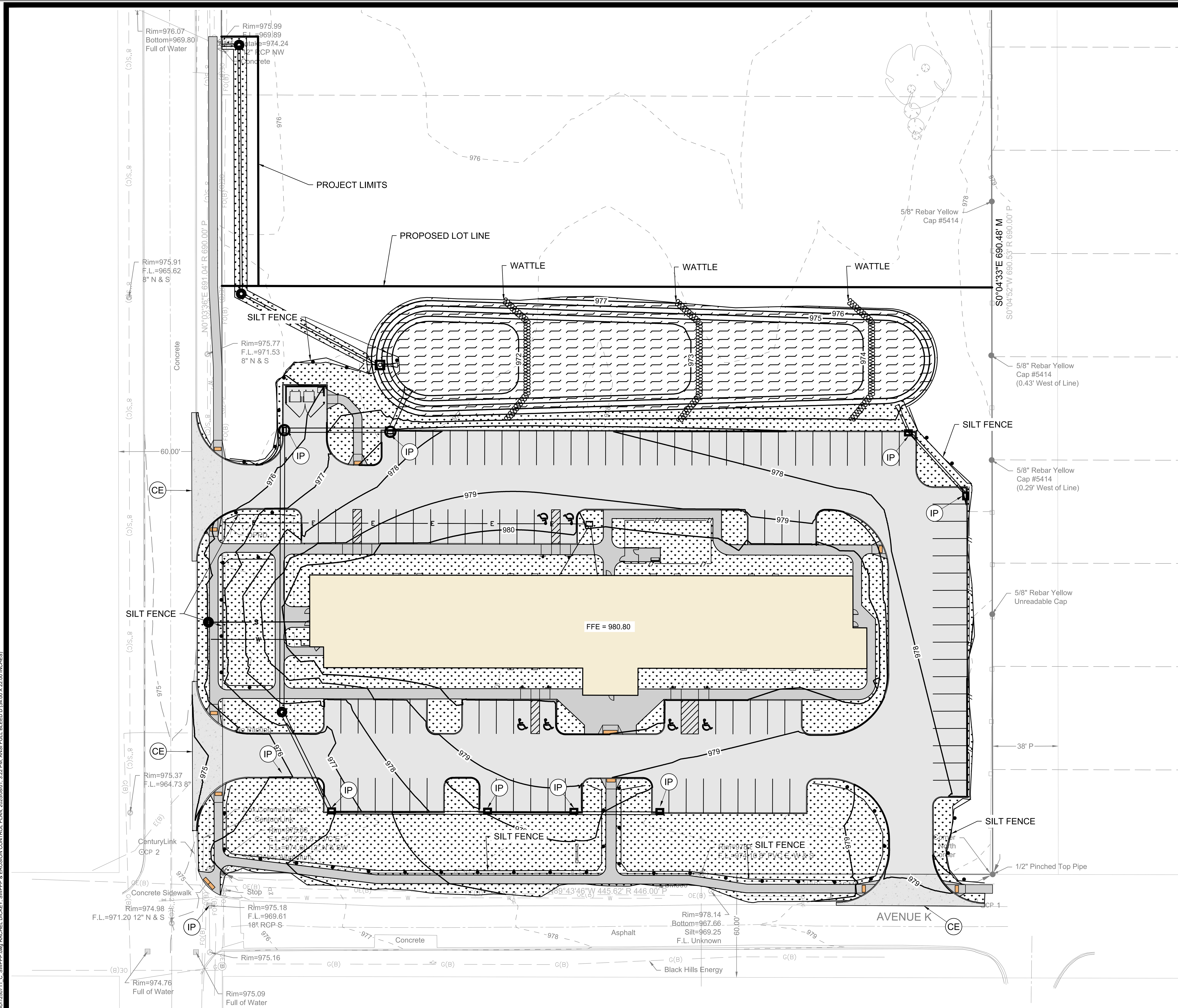
Sheet C7



EROSION CONTROL NOTES

1. ALL DRAINAGE SWALES AND SLOPES 5 TO 1 OR GREATER TO BE SEEDED AND MATTED USING COMMERCIALLY AVAILABLE EROSION CONTROL SEED. MIXTURE APPLIED AT RATE RECOMMENDED BY SUPPLIER.
2. EROSION CONTROL: SEED THE SITE AFTER ROUGH GRADING HAS BEEN COMPLETED. PLACE SILT FENCE AND MAINTAIN IN PROBLEM AREAS AFTER GROUND COVER HAS BEEN ESTABLISHED. COMPLY WITH EROSION CONTROL LAW.
3. PROVIDE BELOW GRADE INLET PROTECTION SUCH AS WATTLES OR SEDIMENT BASKETS IN PAVED AREAS FOLLOWING PAVING OPERATIONS.
4. CONTRACTOR TO INSTALL INLET PROTECTION PER SUDAS AT THE LOCATIONS INDICATED.
5. CONTRACTOR TO INSTALL STABILIZED CONSTRUCTION ENTRANCE AT EACH LOCATION USED DURING CONSTRUCTION.

LEGEND

	SEEDING - SUDAS TYPE 1 SEED MIX
	SEEDING - SUDAS WETLAND MIX
	6" EROSION CONTROL WATTLE
	SILT FENCE
IP	INLET PROTECTION
CE	STABILIZED CONSTRUCTION ENTRANCE

0 30
FEET

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Engineer: EDH | Checked By: CHKD | Scale: 1" = 30'
Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21
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THE RESIDENCE AT CARTER LAKE

CARTER LAKE, IOWA

SWPPP & EROSION CONTROL PLAN

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712-322-3202 | www.snyder-associates.com

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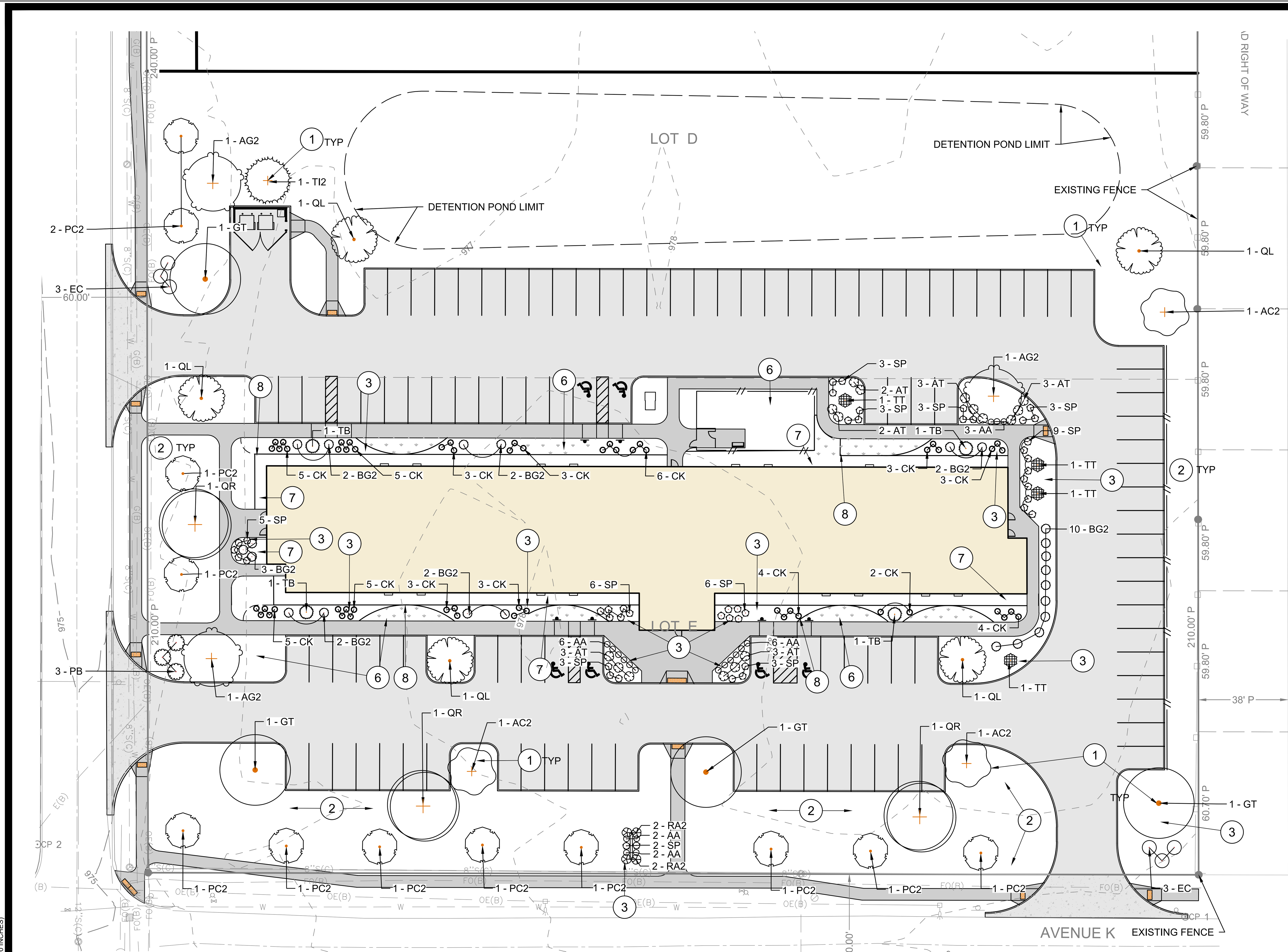


GENERAL PLANTING NOTES

A. UTILITY WARNING:
THE UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND/OR RECORDS OBTAINED. THE SURVEYOR MAKES NO GUARANTEES THAT THE UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA. EITHER IN SERVICE OR ABANDONED. THE SURVEY FURTHER DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED.

B. NOTIFY UTILITY OWNERS PRIOR TO BEGINNING ANY CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR DETERMINING EXISTENCE, EXACT LOCATION AND DEPTH OF ALL UTILITIES. AVOID DAMAGE TO UTILITIES AND SERVICES DURING CONSTRUCTION. ANY DAMAGE DUE TO THE CONTRACTORS CARELESSNESS SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE. COORDINATE AND COOPERATE WITH UTILITY COMPANIES DURING CONSTRUCTION.

C. ALL PLANT MATERIAL SHALL AT LEAST MEET MINIMUM REQUIREMENTS SHOWN IN THE "AMERICAN STANDARDS FOR NURSERY STOCK" (ANSI Z60.1 - LATEST EDITION).

D. CONTRACTOR SHALL GUARANTEE ALL PLANT MATERIAL FOR PERIOD OF ONE YEAR FROM DATE OF INSTALLATION.

PLANTING CONSTRUCTION NOTES

1. PROVIDE 3-INCH DEPTH SHREDDED HARDWOOD MULCH AROUND ALL TREES TO A MIN. 3-FOOT PERIMETER, AND ALL AREAS INDICATED ON PLAN.
2. CONTRACTOR TO SEED ALL AREA DISTURBED BY CONSTRUCTION WITH 90/10 GREENYARD OR APPROVED EQUAL AT 450 LBS / AC SEED RATE UNLESS NOTED OTHERWISE.

   PRODUCT: GREENYARD 90 / 10 OR EQUAL.
   AGRILAND FS, INC
   INDIANOLA, IA 50125
   WWW.AGRILANDFS.COM
   CONTACT: CURT MYERS
   T: (515) 961-8408
3. CONTRACTOR TO PROVIDE A 3-INCH DEPTH SHREDDED HARDWOOD MULCH IN PLANT BED AREAS UNLESS OTHERWISE NOTED ON PLAN. PROVIDE VERTICAL CUT SPADE CUT EDGE TO A DEPTH OF 4-INCHES.
4. PLANTING SUBSTITUTIONS SHALL BE APPROVED IN WRITING BY THE OWNER.
5. REFER TO DETAIL SHEET C10 FOR PLANTING REQUIREMENTS.
6. SOD.
7. PROVIDE1" CLEAN RIVER ROCK MULCH TO 3-INCH DEPTH WITHIN PLANTERS WITH 5 OZ FILTER FABRIC.
8. CONTRACTOR TO INSTALL 4" BY $\frac{3}{8}$ - INCH THICK BLACK METAL EDGING AT LOCATIONS SHOWN ON PLAN.

PLANTING PLAN REQUIREMENTS

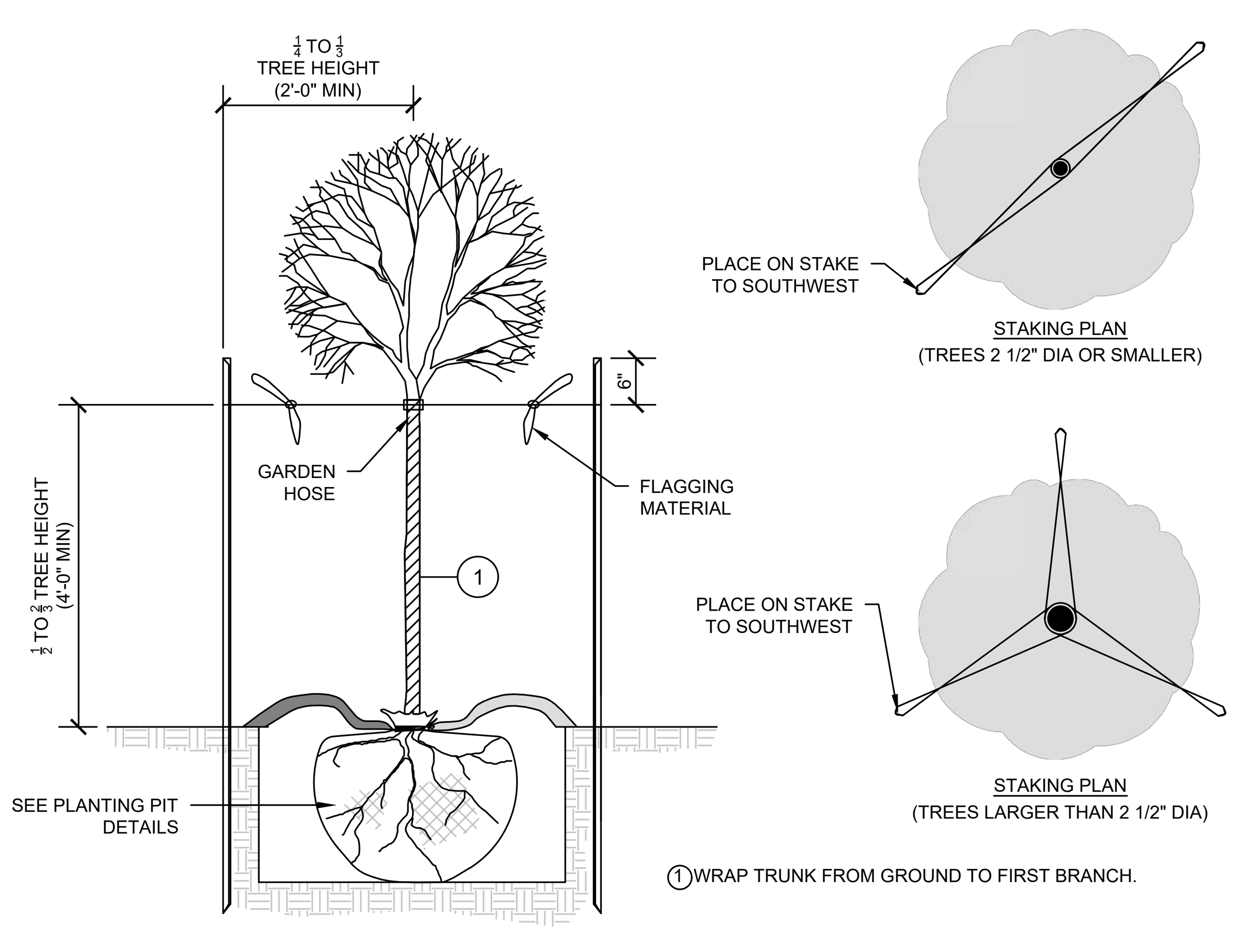
LANDSCAPE REQUIREMENTS AND CALCULATIONS:
(AS PER CARTER LAKE ZONING CODE REQUIREMENTS)

TOTAL LOT AREA = 151,527 SF - 17,475 SF (BUILDING SF)
134,052 SF X10% = 13,405 SF REQUIRED.
134,052 SF - 59,358 SF = 74,694 SF PROVIDED.

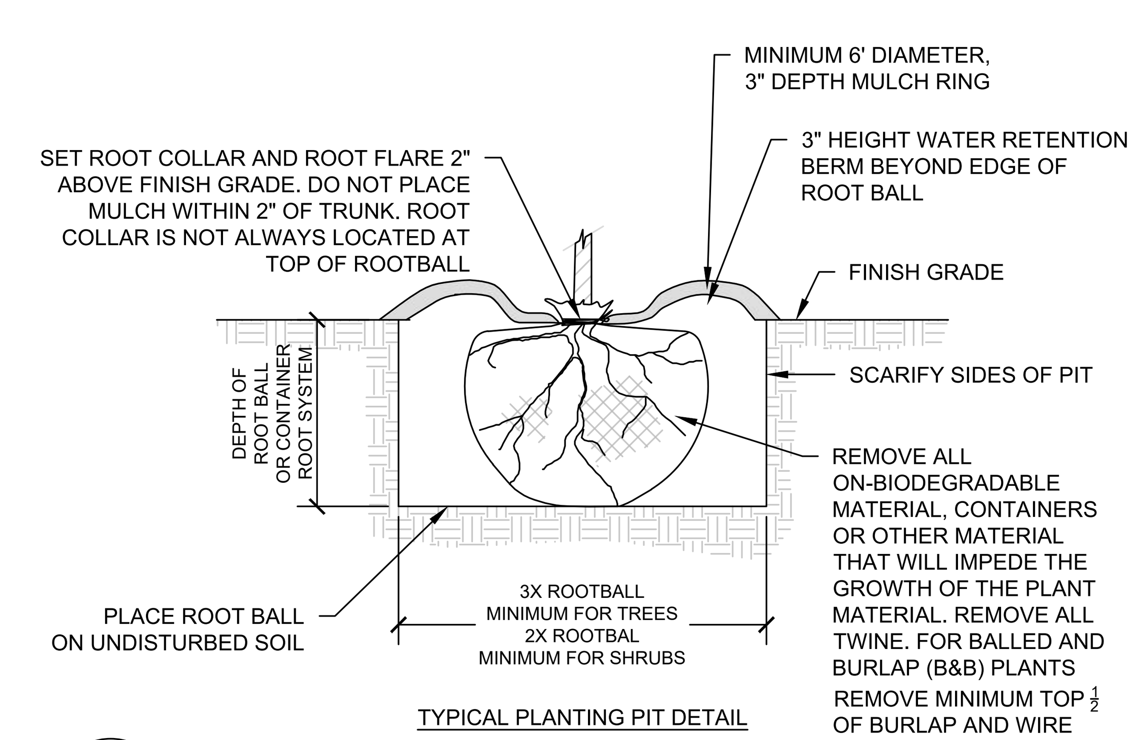
FRONTAGE STREET TREES:
492 TOTAL LF/35 LF = 14 EA REQUIRED (14 PROVIDED)

ON SITE TREE PLANTING:
59,358 SF PAVEMENT AREA / 3,000 SF = 19.78 EA TREE REQUIRED (20 PROVIDED)
PARKING LOT TREES: 6 PROVIDED
FRONTAGE TREES: 14 PROVIDED

LANDSCAPE BUFFER:
EAST BUFFER TO RESIDENTIAL ZONE. SATISFIED BY EXISTING FENCE AS SHOWN ON PLANS.
SOUTH AND WEST: STREET FRONTAGE
NORTH: NO BUFFER REQUIRED



1 / C9 DECIDUOUS TREES STAKING DETAIL
NO SCALE



2 / C9 PLANTING PIT DETAILS
NO SCALE

PLANT SCHEDULE					
CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	TYPE
TREES					
AC2	3	Acer rubrum 'Columnare'	Columnar Red Maple	2" Cal.	B&B
GT	4	Gleditsia triacanthos inermis 'Skyline'	Skyline Honey Locust	2" Cal.	B&B
QL	5	Quercus robur x bicolor 'Long'	Regal Prince® Oak	2" Cal.	B&B
QR	3	Quercus rubra	Red Oak	2" Cal.	B&B
EVERGREEN TREES					
TB	4	Thuja occidentalis 'Brandon'	Brandon Arborvitae	4` Ht.	B&B
TT	4	Thuja occidentalis 'Techny'	Techny Arborvitae	4` Ht.	B&B
TI2	1	Thuja x 'Green Giant'	Green Giant Arborvitae	4` Ht.	
ORNAMENTAL TREES					
AG2	3	Amelanchier x grandiflora 'Autumn Brilliance'	Autumn Brilliance Apple Serviceberry	#7	Pot
PC2	12	Prunus sargentii 'Columnaris'	Columnar Sargent Cherry	1.5" Cal.	B&B
CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER
SHRUBS					
BG2	23	Buxus x 'Green Velvet'	Green Velvet Boxwood	3 gal.	
EC	6	Euonymus alatus 'Compactus'	Compact Burning Bush	3 gal.	Pot
PB	3	Physocarpus opulifolius 'Monlo'	Diabolo® Ninebark	3 gal.	Pot
GRASSES					
CK	54	Calamagrostis x acutiflora 'Karl Foerster'	Karl Foerster Feather Reed Grass	1 gal.	Pot
SP	46	Sporobolus heterolepis	Prairie Dropseed	1 gal.	Pot
PERENNIALS					
AT	16	Asclepias tuberosa	Butterfly Milkweed	4" Plug	
AA	19	Aster dumosus 'Alert'	Alert Fall Aster	1 gal.	Pot
RA2	4	Rudbeckia amplexicaulis	Black-eyed Susan	4" Plug	

GROUNDCOVER PATTERN
SOD

0 30 FEET

MARK | REVISION | DATE | BY
Engineer: EDH | Checked By: CHKD | Scale: 1" = 30'
Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21
Project No: 125.0711.10 | Sheet C11

THE RESIDENCE AT CARTER LAKE
LANDSCAPING PLAN
CARTER LAKE, IOWA

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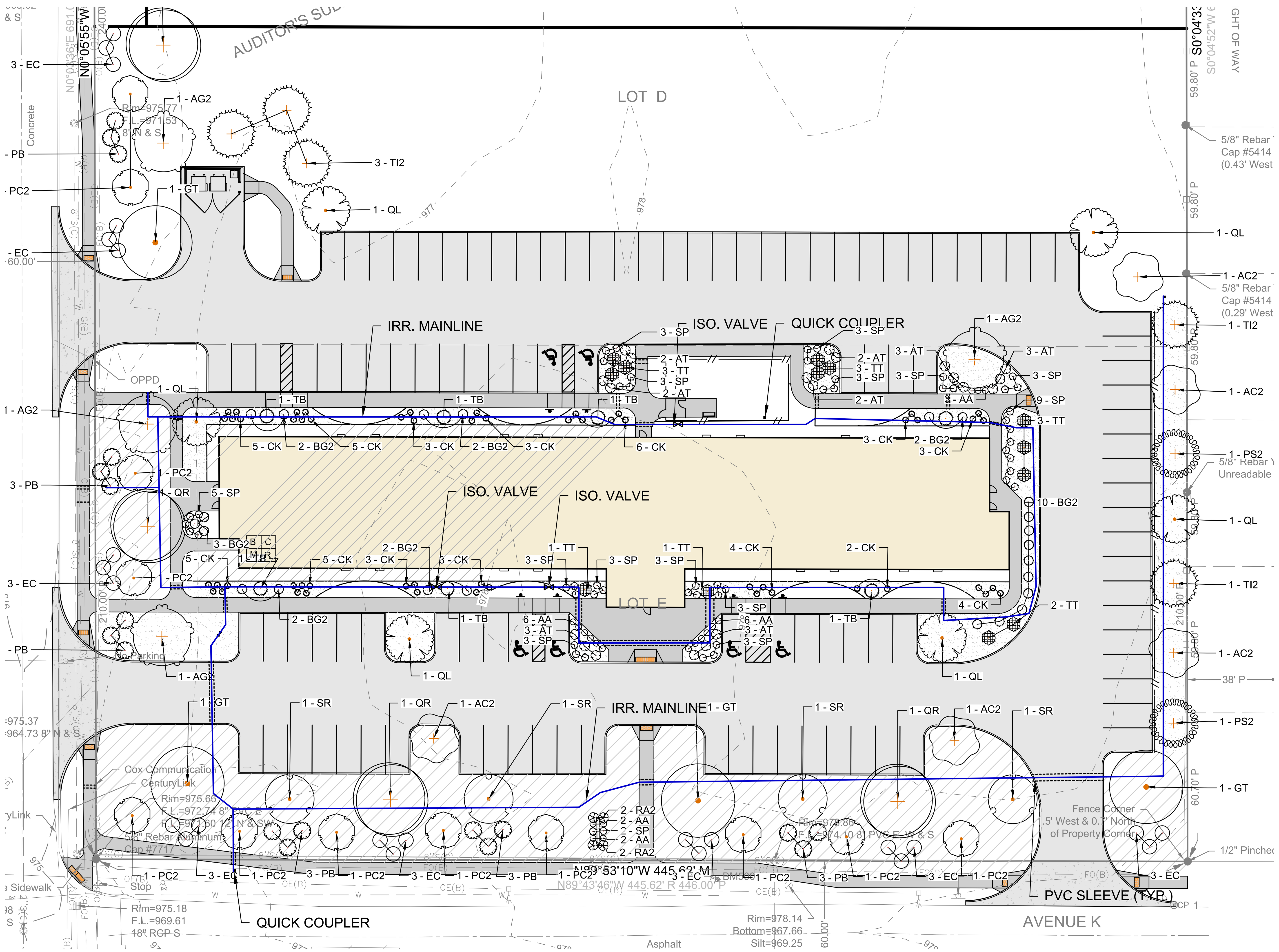

LEGEND

■	¾" QUICK COUPLER VALVE	RAINBIRD 44-RC
C	CONTROLLER	RAINBIRD ESP SERIES
B	BACKFLOW PREVENTER	BY PLUMBING CONTRACTOR
====	PVC SLEEVE	AS SPECIFIED
⋈	ISOLATION VALVE WITH VALVE BOX	NIBCO T-FP-600A
R	WIRELESS RAIN SENSOR	RAINBIRD WR2-RFC
—	IRRIGATION MAIN LINE	PVC MAINLINE (24" MINIMUM DEPTH)
M	METER	BY PLUMBING CONTRACTOR

IRRIGATION PLAN SHOWS SCHEMATIC LAYOUT OF IRRIGATION COMPONENTS.
CONTRACTOR TO FIELD ADJUST DESIGN OF SYSTEM AS CONDITIONS WARRANT.

SEE SHEET C12 FOR IRRIGATION SPECS.

IRRIGATED AREAS

SPRAY HEAD IRRIGATION
TREE / TURF ZONE
AREAS, TOTAL: 20,542 SQ. FT.

DRIP IRRIGATION
SHRUB / PERENNIAL ZONE
AREAS, TOTAL: 4,122 SQ. FT.

IRRIGATION LAYOUT SHOWN INDICATES DESIGN INTENT ONLY. CONTRACTOR IS RESPONSIBLE FOR ADJUSTMENT OF HEAD LOCATIONS TO PROVIDE ADEQUATE COVERAGE.

IRRIGATION GENERAL NOTES

A. CONTRACTOR TO LOCATE AND PROTECT EXISTING UTILITIES IN AND NEAR THE AREA OF WORK. DAMAGE OCCURRING AS A RESULT OF CONSTRUCTION ACTIVITY SHALL BE REPAIRED/REPLACED BY THE CONTRACTOR TO THE OWNER'S SATISFACTION AT NO COST TO THE OWNER.
B. CONTRACTOR TO FURNISH ALL MATERIALS, IRRIGATION EQUIPMENT, PIPE FITTINGS AND ACCESSORIES REQUIRED TO COMPLETE A FULLY-FUNCTIONING SYSTEM.
C. ALL PRIMARY AND SECONDARY WIRE TAPS AND CONNECTIONS SHALL CONFORM WITH STATE AND LOCAL CODES AND BE PERFORMED BY A LICENSED ELECTRICIAN IN THE STATE OF IOWA.
D. ALL WIRE TO BE UL APPROVED FOR DIRECT BURY.
E. ALL PRODUCTS SHALL BE INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS, REQUIREMENTS AND RECOMMENDATIONS.
F. FLOW RATES THROUGH PIPES SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATIONS.
G. INSTALL CONCRETE THRUST BLOCKS AT ALL MAIN LINE PIPE BENDS AND INTERSECTIONS. SEE DETAIL.
H. ALL IRRIGATED AREAS SHALL BE COVERED BY HEAD-TO-HEAD COVERAGE.
I. CONTRACTOR RESPONSIBLE FOR FIELD ADJUSTING IRRIGATION SYSTEM TO PREVENT OVER SPRAY ONTO PAVEMENT, BUILDINGS, FENCES OR STRUCTURES.
J. VALVES SHALL BE CLUSTERED AND COMBINED TO MINIMIZE THE AMOUNT OF VALVE BOXES. ALL BOXES SHALL BE LOCATED IN OUT OF BOUNDS AREAS AS FAR FROM THE FIELD OF PLAY AS POSSIBLE.
K. THE ROUTING OF ANY IRRIGATION LINE UNDER PAVEMENTS, THROUGH WALLS, ETC. SHALL BE FED THROUGH SCHEDULE 40 PVC CONDUITS TWICE THE SIZE OF THE IRRIGATION PIPE TO BE CARRIED. INSTALLATION OF CONDUITS ARE TO BE COORDINATED BY THE PRIME CONTRACTOR AND IRRIGATION CONTRACTOR PRIOR TO CONSTRUCTION.
L. IRRIGATION LAYOUT INDICATES DESIGN INTENT, CONTRACTOR RESPONSIBLE FOR ADJUSTING HEAD AND VALVE LOCATIONS, SELECTION OF NOZZLES, ETC. TO ENSURE ADEQUATE COVERAGE.
M. THE IRRIGATION SYSTEM IS DESIGNED TO BE COMPLETELY DRAINED BY THE USE OF AIR COMPRESSORS TO PROTECT THE PIPE FROM DAMAGE DURING FREEZING TEMPERATURE.
N. CONTRACTOR RESPONSIBLE FOR TRACKING ANY CHANGES OR ADDITIONAL INFORMATION ON AS-BUILT DRAWINGS AND SUBMIT ELECTRONICALLY TO THE ENGINEER FOR FINAL REVIEW.
O. SEE SPECIFICATION SECTION 323000 FOR IRRIGATION INFORMATION, PRODUCTS AND INSTALLATION.

IRRIGATION INSTALLATION NOTES

1. POINT OF CONNECTION
   A. THE POINT OF CONNECTION FOR THE IRRIGATION SYSTEM IS LOCATED IN THE BUILDING LOCATED TO THE WEST SIDE OF THE BUILDING.
   B. IRRIGATION PUMP LOCATION. SEE SPECIFICATIONS.
2. INSTALL ISOLATION VALVE IN IRRIGATION BOX PRIOR TO NEW ELECTRONIC ZONE VALVES. SEE SPECIFICATIONS.
3. ELECTRONIC ZONE VALVES. CLUSTER VALVES IN COMMON VALVE BOX AND LOCATE IN MULCH PLANT BED AREAS.
4. IRRIGATION HEAD WITH SWING JOINT. SEE LEGEND AND SPECIFICATIONS FOR HEAD TYPE.
5. QUICK COUPLER VALVE. COORDINATE LOCATION WITH ENGINEER PRIOR TO INSTALLATION.

SYSTEM REQUIREMENTS
P.O.C. - LOCATED IN A MECHANICAL ROOM WEST SIDE OF THE BUILDING. SEE OWNER FOR ACCESS.

AVAILABLE FLOW
AVAILABLE PRESSURE (ESTIMATED)- 65 PSI

CONTRACTOR TO TEST PRESSURE PRIOR TO SUBSTANTIAL COMPLETION AND SUBMIT TEST RESULTS TO ENGINEER FOR APPROVAL.

N
0 30
FEET

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Engineer: EDH | Checked By: CHKD | Scale: 1" = 30'
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THE RESIDENCE AT CARTER LAKE

CARTER LAKE, IOWA

IRRIGATION PLAN

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Sheet C10

IRRIGATION SYSTEM

PART 1 - GENERAL REQUIREMENTS

1.1 GENERAL

A. THE FOLLOWING IRRIGATION SYSTEM WHEN FULLY COMPLETED SHALL WATER ALL AREAS AS SHOWN ON THE PLANS. IT IS THE INTENT OF THE DIAGRAMMATIC IRRIGATION PLAN TO INSTALL ALL PRODUCTS WITHIN THE AREAS TO BE IRRIGATED.
B. THE CONTRACTOR SHALL PROVIDE ALL DESIGN, LABOR, MATERIALS, EQUIPMENT, AND SUPERVISION REQUIRED TO CONSTRUCT THE IRRIGATION SYSTEM.
C. IRRIGATION SYSTEM SHALL BE INSTALLED AS A COMPLETE COORDINATED SYSTEM. ALL SYSTEM COMPONENTS SHALL BE COORDINATED TO PROVIDE A FULLY COMPATIBLE FUNCTIONING SYSTEM.
D. IRRIGATION SYSTEM COMPONENTS SHALL BE INSTALLED WITH RAIN BIRD EQUIPMENT, OR APPROVED EQUAL PRIOR TO BIDDING.
E. PROVIDE AND INSTALL IRRIGATION CONTROLLER ON SEPARATE CIRCUIT. COORDINATE LOCATION WITH OWNER, 120 VAC WIRING BY ELECTRICAL CONTRACTOR.
F. PROVIDE AND INSTALL SLEEVES UNDER WALKS AND DRIVES AS REQUIRED. BOTH PIPING AND 24 VAC WIRING SLEEVES SHALL BE SCHEDULE 40 PVC. SIZE, DEPTH, AND LOCATION AS REQUIRED. COORDINATE WITH OWNER.

1.2 IRRIGATION DESIGN

A. THE IRRIGATION CONTRACTOR SHALL PREPARE A DETAILED IRRIGATION DESIGN SHOP DRAWING FOR THE ENGINEER AND OWNER'S REVIEW BASED ON THE SCHEMATIC IRRIGATION DRAWING. DESIGN SHALL INCLUDE THE LOCATION OF IRRIGATION CONTROL SYSTEMS, COMPONENTS, LINE SIZES AND OTHER ITEMS TO ENSURE A FULLY-FUNCTIONING IRRIGATION SYSTEM AS INDICATED ON THE DRAWINGS.

1.3 CODES, INSPECTIONS, AND PERMITS

A. THE ENTIRE INSTALLATION SHALL FULLY COMPLY WITH ALL LOCAL AND STATE LAWS AND ORDINANCES, AND WITH ALL THE ESTABLISHED CODES APPLICABLE THERETO.
B. THE CONTRACTOR SHALL TAKE OUT ALL REQUIRED PERMITS, ARRANGE FOR ALL NECESSARY INSPECTIONS AND SHALL PAY ANY FEES AND EXPENSES IN CONJUNCTION WITH THE SAME AS A PART OF THE WORK UNDER THIS SECTION.

1.4 GUARANTEE

A. FOR A PERIOD OF ONE (1) YEAR FROM DATE OF FINAL ACCEPTANCE OF WORK PERFORMED UNDER THIS SECTION, THE CONTRACTOR SHALL PROMPTLY FURNISH AND INSTALL ANY AND ALL PARTS AND EQUIPMENT WHICH PROVE DEFECTIVE IN MATERIALS, WORKMANSHIP, OR INSTALLATION AT NO ADDITIONAL COST TO OWNER.
B. DURING THE ONE (1) YEAR GUARANTEE PERIOD, THE CONTRACTOR SHALL DRAIN THE IRRIGATION SYSTEM AND WINTERIZE IT FOR EACH WINTER DURING THE GUARANTEE PERIOD AND SHALL PUT THE IRRIGATION SYSTEM BACK INTO OPERATION IN THE SPRING AT NO ADDITIONAL COST TO OWNER.

1.5 SUBMITTALS

A. SUBMIT THREE (3) COPIES OF MANUFACTURER'S TECHNICAL DATA AND SPECIFICATIONS FOR ALL COMPONENT PARTS OF THE IRRIGATION SYSTEM. INCLUDE MANUFACTURER'S PRINTED LITERATURE FOR OPERATION AND MAINTENANCE OF OPERATING SYSTEM ELEMENTS.
B. DESCRIBE IN DETAIL, IN THE BID FOR THIS WORK, ANY PROPOSED DEVIATION OR VARIANCE FROM THE EQUIPMENT OR INSTALLATION DESCRIBED HEREIN.
C. SUBMIT THREE (3) COPIES OF THE IRRIGATION DESIGN DRAWING AS PREPARED BY THE IRRIGATION CONTRACTOR, FOR THE ENGINEER'S REVIEW PRIOR TO ORDERING MATERIALS.
D. SUBMIT RESULTS OF A PRESSURE TEST AT THE POINT OF CONNECTION (POC) PRIOR TO SYSTEM INSTALLATION TO VERIFY ADEQUATE PRESSURE AND OPERATION FOR THE PROPOSED IRRIGATION SYSTEM.
E. SUBMIT THREE (3) COPIES OF THE IRRIGATION DESIGN AND INSTALLATION DRAWINGS FOR THE SYSTEM INCLUDING IRRIGATION ZONE ROUTING, VALVE LOCATIONS, PIPING, IRRIGATION CONTROLS, SLEEVING, SPRAY HEADS, CONTROL ZONE COMPONENTS, SHOP DRAWINGS AND OTHER PERTINENT INFORMATION FOR REVIEW AND APPROVAL BY THE ENGINEER PRIOR TO CONSTRUCTION. SHOP DRAWINGS TO INCLUDE PRODUCT/COMPONENT LOCATIONS, CRITICAL DIMENSIONS AND ANY MODIFICATIONS TO THE STANDARD MANUFACTURER'S INSTALLATION DETAILS.

PART 2 - PRODUCTS

2.1 GENERAL

A. ALL IRRIGATION COMPONENTS SHALL BE RAIN BIRD AS MANUFACTURED BY THE RAIN BIRD CORPORATION (WWW.RAINBIRD.COM), OR APPROVED EQUAL. ALL APPROVED EQUAL SUBSTITUTIONS ARE SUBJECT TO REVIEW AND APPROVAL BY ENGINEER AND OWNER FOR EQUALITY TO ORIGINAL EQUIPMENT SELECTIONS. THE CONTRACTOR SHALL SUBMIT ALL REQUESTS FOR APPROVED EQUAL SUBSTITUTIONS TO THE ENGINEER IN WRITING A MINIMUM 10 DAYS PRIOR TO THE BID OPENING FOR APPROVAL.

2.2 COPPER PIPING
A. AS PER LOCAL CODES.

2.3 P.V.C.
A. SIZES 1" DIAMETER AND LARGER.
B. VIRGIN, HIGH IMPACT, POLY-VINYL CHLORIDE (P.V.C.) PIPE, SCHEDULE 1120-1220. MAINLINE PIPING: CLASS 200, HAVING A MINIMUM OF 200 PSI WORKING PRESSURE RATING. LATERAL PIPING: CLASS 200, HAVING A MINIMUM OF 200 PSI WORKING PRESSURE RATING.
C. CONTINUOUSLY AND PERMANENTLY MARKED WITH MANUFACTURER'S NAME, MATERIAL, SIZE, AND SCHEDULE OR TYPE.
D. PIPE: CONFORM TO CS 207-60 OR LATEST REVISION.
E. MATERIAL: CONFORM TO CS 256-63 OR LATEST REVISION.

2.4 P.V.C. PIPE FITTINGS
A. SCHEDULE 40 P.V.C. SOLVENT WELD OR BELLED FITTINGS; SADDLES PROHIBITED.
B. CONFORM TO ASTM D1784, ASTM D2466.

2.5 SLEEVES
A. SEE PLAN FOR LOCATIONS. INSTALL SCHEDULE 40 PVC FOR SLEEVES TO ACCOMMODATE IRRIGATION LINE AND WIRING.

B. COORDINATE THE TIMING OF THE INSTALLATION OF THE SLEEVES TO OCCUR PRIOR TO WALL FOUNDATION CONSTRUCTION AND PAVEMENT TO ENSURE THE SLEEVES ARE PLACED IN THE CORRECT LOCATION AND DEPTH UNDER OR THROUGH PROPOSED IMPROVEMENTS.

2.6 ELECTRONIC CONTROL VALVES

A. RAIN BIRD ELECTRIC CONTROL VALVES, GLOBE AND ANGLE VALVES OPERATED BY LOW-POWER SOLENOID, NORMALLY CLOSED, AND MANUAL FLOW ADJUSTMENT.
B. GROUP VALVES TOGETHER IN VALVE BOXES AS OFTEN AS POSSIBLE.

2.7 CONTROL CABLE

A. ALL ELECTRICAL CONTROL AND GROUND WIRE SHALL BE "UF" DIRECT BURIAL.
B. 12 GA. WHITE COMMON NEUTRAL; 14 G. RED CONTROL WIRE.
C. A SEPARATE COMMON NEUTRAL WIRE IS REQUIRED FROM CONTROLLER A LONG ENTIRE MAIN LINE.
D. PROVIDE ONE SPARE CONTROL WIRE FROM CONTROLLER ALONG ENTIRE MAIN LINE.
E. NO ALUMINUM WIRE ALLOWED.
F. WIRING USED FOR CONNECTING AUTOMATIC REMOTE CONTROL VALVE TO AUTOMATIC CONTROLLERS SHALL BE TYPE "UF", 600 VOLT, SOLID COPPER, SINGLE CONDUCTOR WIRE WITH P.V.C. INSULATION AND BEAR "UL" APPROVAL FOR DIRECT UNDERGROUND BURIAL FEEDER CABLE.
G. DIRECT BURY SPLICE KIT: 3M DBY.

2.8 IRRIGATION HEADS

A. PROVIDE RAINBIRD SPRAY HEADS; SELECT NOZZLES BASED ON AREAS TO BE IRRIGATED. MEET ALL MANUFACTURER'S SPECIFICATIONS, REQUIREMENTS AND RECOMMENDATIONS.
B. SPACING OF HEADS SHALL NOT EXCEED MANUFACTURER'S MAXIMUM RECOMMENDATIONS. HEAD-TO-HEAD COVERAGE IS REQUIRED.
C. MATCHED PRECIPITATION WILL BE REQUIRED ON ALL SPRINKLERS OPERATING ON THE SAME ZONE.
D. CONFORM TO MANUFACTURER'S SPECIFICATIONS CONCERNING DIAMETER OF THROW AND GALLONS AT GIVEN PRESSURES.

2.9 CONTROL EQUIPMENT

A. RAIN BIRD ESP SERIES IRRIGATION CONTROLLER, WALL MOUNTED.
B. PROVIDE IN AN INTERIOR WALL-MOUNTED CONTROLLER BOX WITH LOCKABLE ACCESS. COORDINATE LOCATION WITH MECHANICAL AND ELECTRICAL EQUIPMENT LOCATIONS.
C. FURNISH LOW VOLTAGE SYSTEM MANUFACTURED EXPRESSLY FOR CONTROL OF AUTOMATIC CIRCUIT VALVES OF UNDERGROUND IRRIGATION SYSTEMS. PROVIDE UNIT(S) OF CAPACITY TO SUIT NUMBER OF CIRCUITS, WITH ROOM FOR A MINIMUM FOUR ADDITIONAL ZONES IN THE FUTURE.
D. TRANSFORMER: TO CONVERT SERVICE VOLTAGE TO CONTROL VOLTAGE OF 24 VOLTS.
E. CIRCUIT CONTROL: EACH CIRCUIT VARIABLE FROM APPROXIMATELY 5 TO 60 MINUTES. INCLUDE SWITCH FOR MANUAL OR AUTOMATIC OPERATION OF EACH CIRCUIT.
F. TIMING DEVICE: ADJUSTABLE, 24-HOUR AND 7 OR 14 DAY CLOCKS TO OPERATE ANY TIME OF DAY AND SKIP ANY DAY IN A 7 OR 14 DAY PERIOD.
G. SETTINGS: SOLID STATE.
H. COORDINATE FINAL MOUNTING LOCATION OF CONTROLLER WITH OWNER.
I. NO TIME LAG BETWEEN SECTIONS OR STATIONS.

2.10 REDUCED PRESSURE BACKFLOW DEVICE (RPZ)

A. TO BE FURNISHED AND INSTALLED BY CONTRACTOR.
B. CONNECTION TO BACKFLOW DEVICE SHALL BE INSTALLED ACCORDING TO LOCAL CODES AND MANUFACTURER'S SPECIFICATIONS, REQUIREMENTS AND RECOMMENDATIONS.
C. PROVIDE ALL PIPING, FITTINGS AND SUPPORT EQUIPMENT FRAME WORK AND FASTENERS TO PROVIDE REQUIRED CLEARANCES. PROVIDE STEEL SUPPORTS AND ANCHOR TO CONCRETE SLAB TO SUPPORT DEVICE.
D. SUBMIT PRODUCT INFORMATION TO ENGINEER FOR REVIEW PRIOR TO INSTALLATION.
E. TO BE INSTALLED IN THE BUILDING MECHANICAL ROOM. LOCATION AS PER THE MECHANICAL/ELECTRICAL/PLANTING PLANS. COORDINATE LOCATION WITH OTHER MECHANICAL WORK AND EQUIPMENT PRIOR TO CONSTRUCTION.

2.11 IRRIGATION METER

A. CONTRACTOR TO PROVIDE AS PER LOCAL CODE.

2.12 QUICK COUPLING VALVES

A. LOCATED IN INTERVALS ALONG ALL MAINLINE PIPE. VERIFY FINAL LOCATIONS WITH OWNER. SEE PLAN FOR LOCATIONS.
B. INSTALL QUICK COUPLING VALVE IN 10" VALVE BOX.
C. PROVIDE MATCHING QUICK COUPLER KEYS. ONE KEY FOR EACH 3 COUPLING VALVES.

2.13 ISOLATION GATE VALVES

A. SEE PLANS FOR LOCATION AND VERIFY FINAL LOCATIONS WITH THE OWNER.
B. SIZE VALVE TO MATCH LINE SIZE.
C. NIBCO BRASS BALL VALVE S-FP-600A TWO PIECE VALVE, OR EQUAL, AS PER MANUFACTURER'S SPECIFICATIONS.
D. INSTALL ISOLATION GATE VALVES IN 10" VALVE BOX IN LOCATIONS SHOWN ON PLANS.

2.14 VALVE BOX FOR ELECTRICAL CONTROL VALVES

A. ALL VALVE BOX LOCATIONS TO BE APPROVED BY OWNER PRIOR TO INSTALLATION
B. SINGLE VALVE SETUP: 12" CIRCULAR BOX.
C. MULTI-VALVE SETUP: OVERSIZED BOX. USE MANUFACTURER'S RECOMMENDED EXTENSION KITS IF REQUIRED.

2.15 SLEEVES

A. COORDINATE WITH OWNER AS NECESSARY FOR LOCATIONS. INSTALL SCHEDULE 40 PVC FOR SLEEVES TO ACCOMMODATE IRRIGATION LINE AND WIRING.

2.16 SWING JOINTS

A. LASCO 360 DEG. SWING JOINT ASSEMBLY AS MANUFACTURED BY PHILIPS INDUSTRIES OR APPROVED EQUAL.

2.17 DRIP IRRIGATION COMPONENTS

A. PROVIDE AND INSTALL ALL EQUIPMENT AND MATERIALS, DELIVERED NEW TO THE SITE IN UNOPENED CONTAINERS WITHOUT FLAWS OR DEFECTS.
B. PROVIDE CONTROL ZONE KIT ASSEMBLY AS MANUFACTURED BY RAIN BIRD THAT INCLUDES CONTROL VALVE FILTRATION AND PRESSURE REGULATION SIZED TO MEET WATER DEMANDS AND FLOW REQUIREMENTS. MEET ALL MANUFACTURER'S SPECIFICATIONS, REQUIREMENTS AND RECOMMENDATIONS.
C. PROVIDE FLEXIBLE DUAL-LAYERED PRESSURE COMPENSATING XF SERIES DRIPLINE ON-SURFACE DRIPLINE WITH EMITTER SPACING AND DRIPLINE ROW SPACING TO DELIVERED RECOMMENDED WATER SUPPLY TO PLANT MATERIAL AS SHOWN IN THE AREAS INDICATED IN THE PLANS AND APPROVED SHOP DRAWING.
D. PROVIDE INSERT OR COMPRESSION FITTINGS THAT ARE COMPATIBLE WITH INLINE EMITTER TUBING AS REQUIRED.
E. PROVIDE LOW-VOLUME POINT-SOURCE EMISSION DEVICES TO EFFICIENTLY DELIVER IRRIGATION WATER TO THE PLANT ROOT ZONE.

PART 3 - EXECUTION

3.1 SYSTEM DESIGN

A. DESIGN PRESSURE: VERIFY WATER PRESSURE PRIOR TO CONSTRUCTION.
B. LOCATION OF IRRIGATION MAIN LINE: LOCATE LINES AS PER MANUFACTURER'S RECOMMENDATIONS. MAKE ADJUSTMENTS AS NECESSARY TO AVOID PLANTINGS AND OTHER OBSTRUCTIONS. EXACT LOCATIONS OF PIPING, VALVES, AND OTHER COMPONENTS SHALL BE ESTABLISHED BY THE CONTRACTOR IN THE FIELD AT TIME OF INSTALLATION AND ON THE APPROVED SHOP DRAWINGS.
C. LOCATION OF HEADS: LOCATE HEADS AS PER MANUFACTURER'S RECOMMENDATIONS. MAKE MINOR ADJUSTMENTS AS NECESSARY TO AVOID PLANTINGS AND OTHER OBSTRUCTIONS. IRRIGATION SYSTEM LAYOUT IS DIAGRAMMATIC. EXACT LOCATIONS OF PIPING, SPRINKLER HEADS, VALVES, AND OTHER COMPONENTS SHALL BE ESTABLISHED BY THE CONTRACTOR IN THE FIELD AT TIME OF INSTALLATION AND ON THE APPROVED SHOP DRAWINGS.
D. MINIMUM WATER COVERAGE: SYSTEM TO BE DESIGNED TO DELIVER THE EQUIVALENT OF 1.5" OF RAINFALL PER WEEK. SYSTEM OPERATING TIME NOT T EXCEED 8 HOURS PER 24 HOUR DAY.
E. MINOR ADJUSTMENTS TO SYSTEM FIELD LAYOUT WILL BE PERMITTED TO CLEAR EXISTING FIXED OBSTRUCTIONS; FINAL FIELD LAYOUT SHALL BE ACCEPTABLE TO THE OWNER BASED ON THE APPROVED SHOP DRAWINGS.

3.2 INSTALLATION

A. EXCAVATING AND BACKFILLING:
1. EXCAVATION SHALL INCLUDE ALL MATERIALS ENCOUNTERED, EXCEPT MATERIALS THAT CANNOT BE EXCAVATED BY NORMAL MECHANICAL MEANS.
a. ROCK EXCAVATION: SUBMIT A UNIT COST PER FOOT OF TRENCH FOR ROCK EXCAVATION. INCLUDE IN PRICE ADDITIONAL BACKFILL MATERIALS REQUIRED TO REPLACE EXCAVATED ROCK.
2. EXCAVATE TRENCHES OF SUFFICIENT DEPTH AND WIDTH TO PERMIT PROPER HANDLING AND INSTALLATION OF PIPE AND FITTINGS.
3. IF THE PULLING METHOD IS USED, THE PIPE "PLOW" SHALL BE A VIBRATORY TYPE. STARTING AND FINISHING HOLES FOR PIPE PULLING SHALL NOT EXCEED A 1'-0" BY 3'-0" OPENING.
4. EXCAVATE TO DEPTHS REQUIRED TO PROVIDE 2" DEPTH OF EARTH FILL OR SAND BEDDING FOR PIPING WHEN ROCK OR OTHER UNSUITABLE BEARING MATERIAL IS ENCOUNTERED.
5. FILL TO MATCH ADJACENT GRADE ELEVATIONS WITH APPROVED EARTH FILL MATERIAL. PLACE AND COMPACT FILL IN LAYERS NOT GREATER THAN 8" DEPTH.
a. PROVIDE APPROVED EARTH FILL OR SAND TO A POINT 4" ABOVE THE TOP OF PIPE.
b. OVERFILL WITH APPROVED EXCAVATED OR BORROW FILL MATERIALS FREE OF LUMPS OR ROCKS LARGER THAN 3" IN ANY DIMENSION. LEVEL, COMPACT AND WATER SETTLE. SHOULD SETTLEMENT OCCUR, REFILL AND RE-SOD AS REQUIRED.
6. EXCEPT AS INDICATED, INSTALL IRRIGATION MAINS WITH A MINIMUM COVER OF 18" BASED ON FINISHED GRADES. INSTALL IRRIGATION LATERALS WITH A MINIMUM COVER OF 12" BASED ON FINISHED GRADES.
7. EXCAVATE TRENCHES AND INSTALL PIPING AND FILL DURING THE SAME WORKING DAY. DO NOT LEAVE OPEN TRENCHES OR PARTIALLY FILLED TRENCHES OPEN OVERNIGHT.

B. POLYETHYLENE PIPE (PE)

1. INSTALL POLYETHYLENE PIPE IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE FOR THERMAL EXPANSION AND CONTRACTION.
2. WHERE NECESSARY SAW CUT POLYETHYLENE PIPE, USING A SQUARE-IN SAWING DEVICE TO ENSURE A SQUARE CUT. REMOVE BURRS AND SHAVINGS AT CUT ENDS PRIOR TO INSTALLATION.
3. MAINTAIN PIPE INTERIORS FREE OF DIRT AND DEBRIS. CLOSE OPEN ENDS OF PIPE BY ACCEPTABLE METHODS WHEN PIPE INSTALLATION IS NOT IN PROGRESS AND OVER ALL NON-WORKING HOURS.

C. HEADS, FITTINGS, VALVES, AND ACCESSORIES:

1. INSTALL FITTINGS, VALVES, SPRINKLER HEADS, RISERS, AND ACCESSORIES IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
a. PROVIDE CONCRETE THRUST BLOCKS WHERE REQUIRED AT FITTINGS VALVES AND ALL CHANGE OF DIRECTIONS.
2. SET SPRINKLER HEADS PERPENDICULAR TO FINISH GRADES, EXCEPT AS OTHERWISE INDICATED.
3. INSTALL ROTORS WITH MANUFACTURED O-RING SWING JOINTS.
4. OBTAIN OWNER'S REVIEW AND ACCEPTANCE OF HEIGHT FOR PROPOSED SPRINKLER HEADS AND VALVES PRIOR TO INSTALLATION.
5. LOCATE SPRINKLER HEADS TO ASSURE PROPER COVERAGE OF INDICATED AREAS. DO NOT EXCEED SPRINKLER HEAD SPACING DISTANCES INDICATED.
6. INSTALL GEAR-DRIVEN SPRINKLERS ON 360-DEGREE SWING JOINT ASSEMBLY AS PER MANUFACTURER'S RECOMMENDATION.
7. INSTALL QUICK-COUPLING VALVES IN 10" VALVE BOX ON 360-DEGREE SWING JOINT ASSEMBLY AS PER MANUFACTURER'S RECOMMENDATION WITH STABILIZER.
8. INSTALL FITTINGS AND ACCESSORIES AS SHOWN OR REQUIRED TO COMPLETE THE SYSTEM.
9. INSTALL CONTROLLER:
a. COORDINATE LOCATION WITH OWNER.
b. WATERPROOF WIRE CONDUIT TO PROVIDE A COMPLETE, WATERPROOF, PERMANENT AND NEAT JOB.
c. GROUND CONTROLLER IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
10. INSTALL IN-GROUND CONTROL VALVES IN A VALVE ACCESS BOX AS INDICATED.
11. INSTALL VALVE ACCESS BOXES ON A SUITABLE BASE OF GRAVEL TO PROVIDE A LEVEL FOUNDATION AT PROPER GRADE TO PROVIDE DRAINAGE OF THE ACCESS BOX.
12. SEAL THREADED CONNECTIONS ON PRESSURE SIDE OF CONTROL VALVES AS PER MANUFACTURER'S RECOMMENDATIONS.

D. CONTROL WIRING:

1. INSTALL ELECTRIC CONTROL CABLE IN THE PIPING TRENCHES WHEREVER POSSIBLE. PLACE WIRE IN TRENCH ADJACENT TO PIPE. INSTALL WIRE WITH SLACK TO ALLOW FOR THERMAL EXPANSION AND CONTRACTION. EXPANSION JOINTS IN WIRE SHALL BE PROVIDED AS PER MANUFACTURER'S RECOMMENDATIONS. WHERE NECESSARY TO RUN WIRE IN A SEPARATE TRENCH, PROVIDE A MINIMUM COVER OF 12".
2. PROVIDE SUFFICIENT SLACK AT SITE CONNECTIONS AT REMOTE CONTROL VALVES IN CONTROL BOXES, AND AT ALL WIRE SPLICES TO ALLOW RAISING THE VALVE BONNET OR SPLICE TO THE SURFACE WITHOUT DISCONNECTING THE WIRES WHEN REPAIR IS REQUIRED.
3. MAKE WIRE CONNECTIONS TO REMOTE CONTROL ELECTRIC VALVES AND SPLICES OF WIRE IN THE FIELD, USING 3M DBY OR 3M DBR DIRECT BURY SPLICE KIT (OR APPROVED EQUAL).
4. PROVIDE TIGHT JOINTS TO PREVENT LEAKAGE OR WATER AND CORROSION BUILD-UP ON THE JOINT.

E. SLEEVES: COORDINATE WITH OWNER. INSTALL SLEEVES PRIOR TO INSTALLATION OF PAVEMENT AND RETAINING WALLS. THE SCHEDULING AND COORDINATION OF THE IRRIGATION SLEEVES IS THE IRRIGATION CONTRACTOR'S RESPONSIBILITY.

F. FLUSHING, TESTING, AND ADJUSTMENT:

1. AFTER SPRINKLER PIPING AND RISERS/SWING JOINTS ARE INSTALLED AND BEFORE SPRINKLER HEADS ARE INSTALLED, OPEN CONTROL VALVES AND FLUSH OUT THE SYSTEM WITH FULL HEAD OF WATER.
2. PERFORM SYSTEM TESTING UPON COMPLETION OF EACH SECTION. MAKE NECESSARY REPAIRS AND RE-TEST REPAIRED SECTIONS AS REQUIRED.
3. ADJUST SPRINKLERS AFTER INSTALLATION FOR PROPER AND ADEQUATE DISTRIBUTION OF THE WATER OVER THE COVERAGE PATTERN. ADJUST FOR THE PROPER ARC OF COVERAGE.
4. TIGHTEN NOZZLES ON SPRAY TYPE SPRINKLERS AFTER INSTALLATION. ADJUST SPRINKLER ADJUSTING SCREW ON LATERAL LINE OR CIRCUIT AS REQUIRED FOR PROPER RADIUS. INTERCHANGE NOZZLES PATTERNS AS DIRECTED BY THE OWNER TO GIVE BEST ARC OF COVERAGE.
5. ADJUST ALL ELECTRIC REMOTE CONTROL VALVE FLOW CONTROL STEMS FOR SYSTEM BALANCE.
6. TEST AND DEMONSTRATE THE CONTROLLER BY OPERATING APPROPRIATE DAY, HOUR, AND STATION SELECTION FEATURES AS REQUIRED TO AUTOMATICALLY START AND SHUT DOWN IRRIGATION CYCLES TO ACCOMMODATE PLANT REQUIREMENTS AND WEATHER CONDITIONS.

G. PVC PIPE AND FITTINGS:

1. USE ONLY STRAP-TYPE FRICTION WRENCHES FOR THREADED PLASTIC PIPE.
2. PVC SOLVENT WELD PIPE AND FITTINGS:
a. USE APPROPRIATE PRIMER AND SOLVENT CEMENT. JOIN PIPE IN MANNER RECOMMENDED BY PIPE AND FITTING MANUFACTURERS AND IN ACCORDANCE WITH ACCEPTED INDUSTRY PRACTICES.
b. CURE FOR THIRTY (30) MINUTES BEFORE HANDLING AND TWENTY-FOUR (24) HOURS BEFORE PRESSURIZING OR INSTALLING WITH VIBRATORY PLOW.
c. SNAKE PIPE FROM SIDE TO SIDE WITHIN TRENCH.
3. PVC THREADED CONNECTIONS:
a. USE ONLY FACTORY-FORMED THREADS. FIELD-CUT THREADS ARE NOT PERMITTED.
b. APPLY THREAD SEALANT IN MANNER RECOMMENDED BY COMPONENT, PIPE AND SEALANT MANUFACTURERS AND IN ACCORDANCE WITH ACCEPTED INDUSTRY PRACTICES.

H. DRIPLINE TUBING AND FITTINGS:
I. USE ONLY MANUFACTURED DRIPLINE TUBING CONNECTIONS OR TRANSITIONS AS RECOMMENDED BY MANUFACTURER.

3.3 DRIPLINE LAYOUT OF WORK

A. LAYOUT OUT DRIPLINE IRRIGATION SYSTEM BEFORE INSTALLATION OF ANY COMPONENTS. ITEMS INCLUDE MANIFOLD/HEADER PIPE AND TUBING, SLEEVES, CONTROL ZONE ASSEMBLIES, FLUSH VALVES, AIR RELIEF VALVES AND CHECK VALVES BASED ON THE APPROVED SHOP DRAWING.

B. DETERMINE ANY CONFLICTS AND NECESSARY CHANGES AND CONTACT THE ENGINEER WITH ANY REQUIRED ADJUSTMENTS PRIOR TO INSTALLATION. MARK ANY REVISIONS TO THE AS-BUILT DRAWINGS.

3.4 DRIPLINE EXCAVATION, TRENCHING AND BACKFILL

A. EXCAVATE AND INSTALL PIPES AT MINIMUM COVER INDICATED ON THE DRAWINGS OR SPECIFICATIONS.
B. MINIMUM COVER FOR DRIPLINE COMPONENTS (TOP OF PIPE TO FINISHED GRADE):
1. BURIED PVC MANIFOLD AND SUPPLY HEADER PIPE TO DRIPLINE GRID LAYOUTS: 12" TO TOP OF PIPE.
2. BURIED DRIPLINE LATERAL PIPE DOWNSTREAM OF PVC MANIFOLD AND SUPPLY HEADER PIPE: 4" TO TOP OF PIPE
3. ON-GRADE DRIP LINE LATERAL PIPE DOWNSTREAM PVC MANIFOLD AND SUPPLY HEADER PIPE: SECURE TO FINISHED GRADE WITH APPROVED TUBING STAKES.
C. INSTALL AND TEST PIPING PRIOR TO INSTALLATION OF LANDSCAPE FABRIC AND MULCH.
D. BACKFILL ONLY AFTER BURIED LINES HAVE BEEN REVIEWED, TESTED AND APPROVED.
E. EXCAVATED MATERIAL IS GENERALLY SATISFACTORY FOR BACKFILL. USE BACKFILL FREE OF SHARP ANGLES, RUBBISH, VEGETATIVE MATTER, FROZEN MATERIALS AND STONES LARGER THAN 1" DIAMETER. REMOVE MATERIAL NOT SUITABLE FOR BACKFILL.
F. DRESS BACKFILL AREAS TO ORIGINAL GRADE.
CONTACT ENGINEER FOR TRENCH DEPTH ADJUSTMENTS WHERE UTILITIES CONFLICT WITH IRRIGATION TRENCHING AND PIPEWORK.

3.5 INSTALLATION OF DRIPLINE IRRIGATION COMPONENTS

A. CONTROL ZONE KIT ASSEMBLY
1. FLUSH MAINLINE BEFORE INSTALLING CONTROL ZONE KIT ASSEMBLY.
2. CONNECT CONTROL WIRES TO REMOTE CONTROL VALVE WIRES USING SPECIFIED WIRE CONNECTORS AND WATERPROOF SEALANT. PROVIDE CONNECTORS AND SEALANT AS PER MANUFACTURER'S RECOMMENDATIONS.
3. INSTALL A MAXIMUM OF FOUR (4) LOW FLOW OR MEDIUM FLOW CONTROL ZONE KITS PER STANDARD RECTANGULAR VALVE BOX. INSTALL A MAXIMUM OF ONE (1) MEDIUM FLOW COMMERCIAL CONTROL ZONE KIT PER RECTANGULAR VALVE BOX. INSTALL A MAXIMUM OF ONE HIGH FLOW COMMERCIAL CONTROL ZONE KITS PER JUMBO RECTANGULAR VALVE BOX.
a. LOCATE VALVE BOXES AT LEAST 12" FROM AND ALIGN WITH, NEARBY WALLS OR EDGES OF PAVED AREAS.
b. GROUP CONTROL ZONE KIT ASSEMBLIES TOGETHER WHERE PRACTICAL. ALIGN GROUPED BOXES IN UNIFORM PATTERNS. ALLOW AT LEAST 12" BETWEEN BOXES.
c. BRAND CONTROLLER LETTER AND STATION NUMBERS ON THE VALVE BOX LID.

B. LATERAL PIPING AND DRIPLINE TUBING

1. INSTALL LATERAL PIPING AND DRIPLINE TUBING AT LOCATIONS AND IN GRID PATTERNS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
2. THOROUGHLY FLUSH PVC LATERAL PIPING, SUPPLY HEADERS AND DRIPLINE TUBING IMMEDIATELY UPON INSTALLATION.

C. AIR RELIEF VALVE KIT ASSEMBLY: INSTALL AT ALL HIGH POINTS IN DRIPLINE TUBING GRID AND AS RECOMMENDED BY MANUFACTURER.
D. FLUSH POINT ASSEMBLY: INSTALL IN FLUSH HEADER OR AT ENDS OF EACH DRIPLINE ZONE SEGMENT AS SHOWN AND DIRECTED ON DRAWINGS AND INSTALLATION DETAILS. INSTALL AT LEAST 12 INCHES FROM AND ALIGN WITH ADJACENT WALLS OR EDGES OF PAVED AREAS.

3.6 SPARE PARTS

A. PROVIDE:
3. ONE EXTRA SPRINKLER HEAD OF EACH SIZE AND TYPE.
4. ONE EXTRA VALVE OF EACH SIZE.
5. ONE EXTRA VALVE ACCESS BOX.
6. ONE QUICK COUPLER VALVE KEY FOR EACH 3 QUICK COUPLER VALVES.

3.7 AS-BUILT DRAWING
A. FURNISH ACCURATE REPRODUCIBLE "AS-BUILT" DRAWINGS OF ALL COMPONENTS. STATE THE SIZE, MANUFACTURER, MODEL NUMBER, PART NUMBER, SIZE, AND EXACT LOCATION OF EACH AND EVERY ITEM FURNISHED AND INSTALLED BY THIS CONTRACTOR. FINAL PAYMENT CAN BE WITHHELD UNTIL "AS-BUILT" HAS BEEN PROVIDED TO AND APPROVED THE OWNER.
B. CONTRACTOR WILL FURNISH OWNER WITH 2 BOUND COPIES OF INSTRUCTION SHEETS AND PARTS LISTS COVERING ALL OPERATING EQUIPMENT.

3.8 ACCEPTANCE

A. TEST AND DEMONSTRATE TO THE OWNER THE SATISFACTORY OPERATION OF THE SYSTEM FREE OF LEAKS.
B. INSTRUCT THE OWNER'S STAFF IN THE OPERATION OF THE SYSTEM, INCLUDING ADJUSTMENT OF SPRINKLERS, CONTROLLER(S), VALVES, AND PUMP CONTROLS.
C. THE IRRIGATION SYSTEM MUST BE IN FULL OPERATION WITHIN ONE WEEK OF PLANTING OPERATIONS. IT IS THE INTENT AND MANDATORY REQUIREMENT THAT THE SYSTEM BE INSTALLED TO PROVIDE THE WATER FOR THE NEWLY INSTALLED PLANT MATERIAL.

MARK	REVISION	DATE	BY

Engineer: EDH | Checked By: CHKD | Scale: 1" = N/A
Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21
Project No: 125.0711.10 | Sheet C11

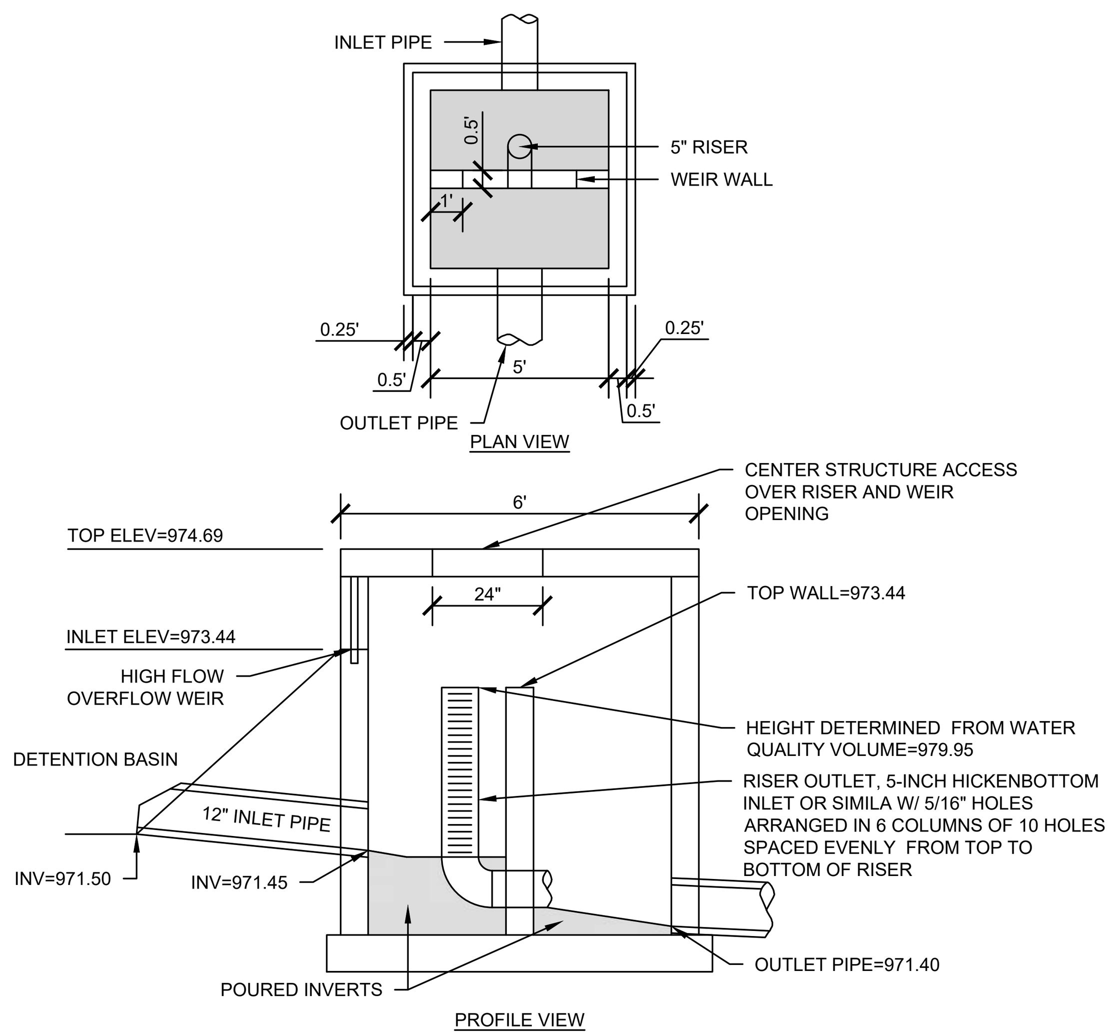
THE RESIDENCE AT CARTER LAKE
IRRIGATION PERFORMANCE SPECIFICATIONS
CARTER LAKE, IOWA

SNYDER & ASSOCIATES, INC.
231 BENNETT AVENUE
COUNCIL BLUFFS, IOWA 51503
712-322-3202 | www.snyder-associates.com

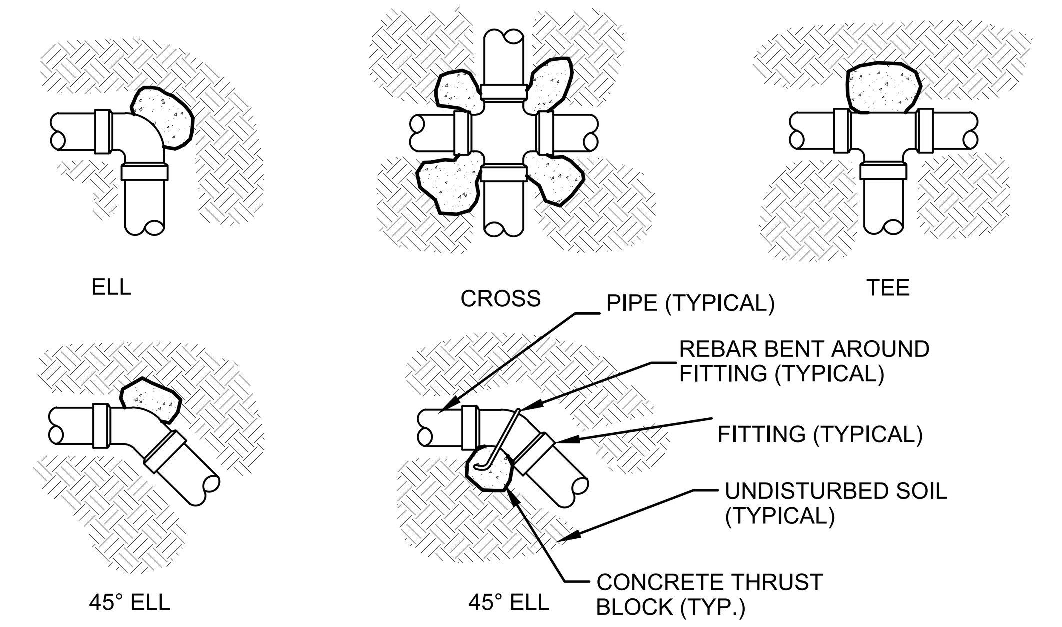
SNYDER & ASSOCIATES

Project No: 125.0711.10

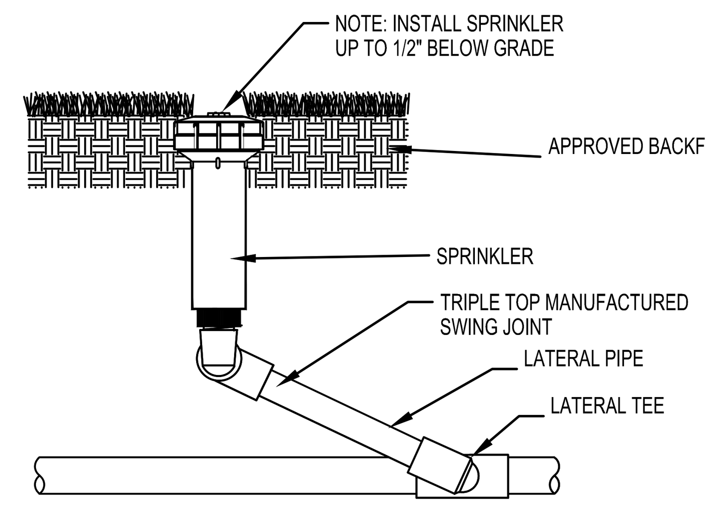
Sheet C11



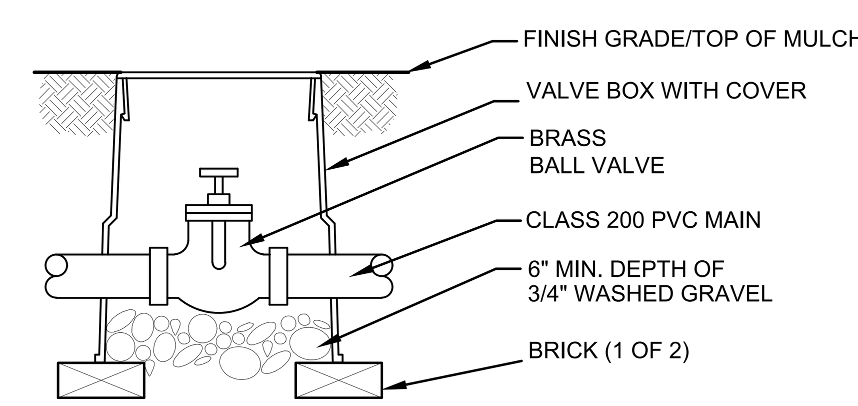
1
C12
MODIFIED OPEN-SIDED AREA INTAKE OUTLET STRUCTURE
NO SCALE



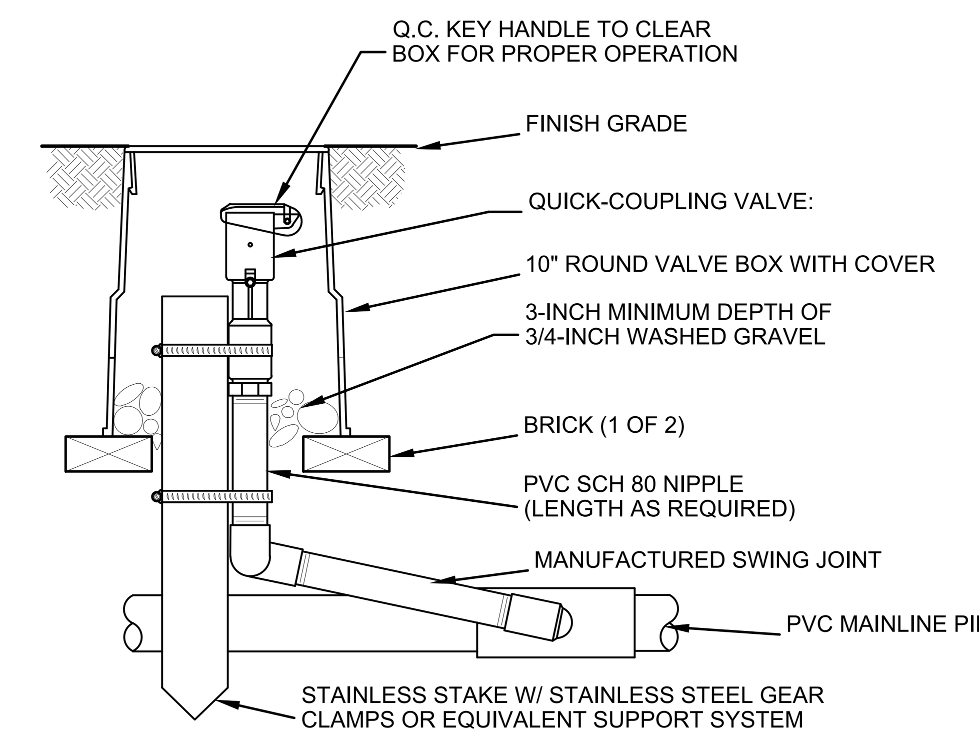
2
C12
IRRIGATION THRUST BLOCK DETAILS
NO SCALE



3
C12
SPRINKLER WITH SWING JOINT
NO SCALE



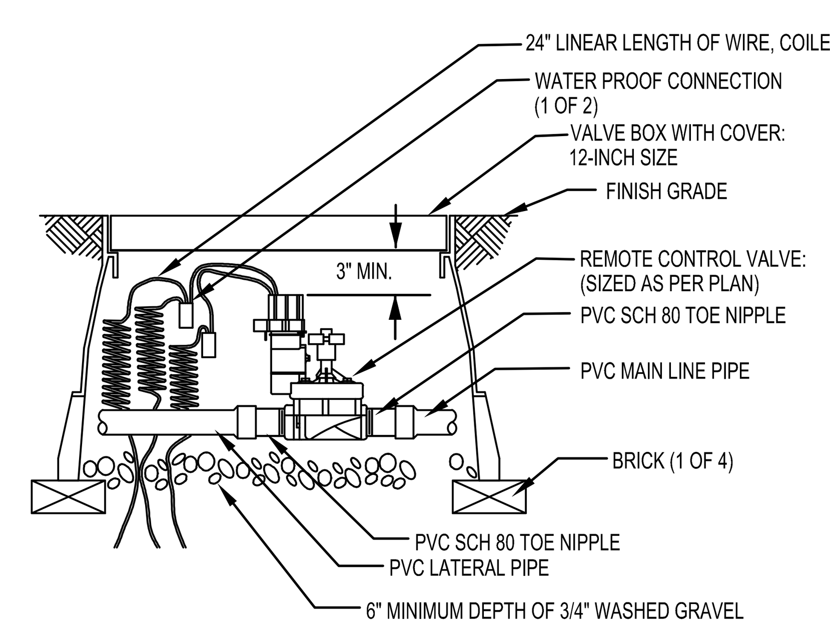
4
C12
ISOLATION VALVE AND BOX
NO SCALE



NOTE:

1. FURNISH FITTINGS AND PIPING NOMINALLY SIZED IDENTICAL TO NOMINAL QUICK COUPLING VALVE INLET SIZE.

6
C12
QUICK COUPLER
NO SCALE



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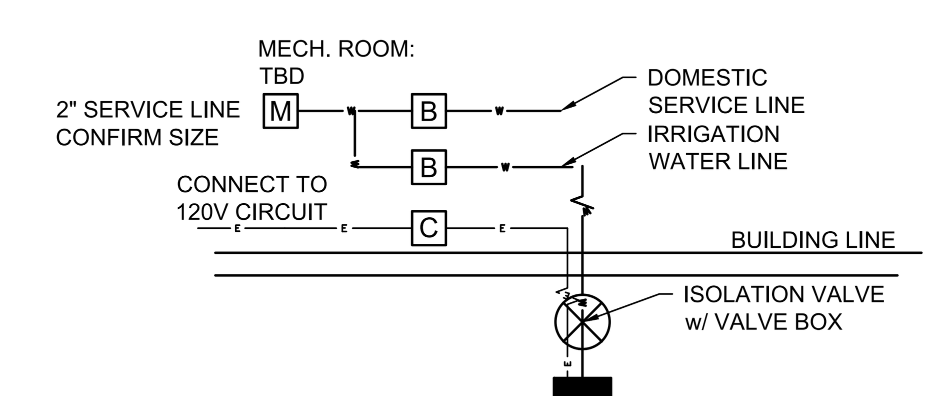
C12
ELECTRIC VALVE AND VALVE BOX
NO SCALE



NOTE:
EQUIPMENT TO BE LOCATED INSIDE BUILDING. CONTRACTOR TO COORDINATE LOCATION AND ROUTING OF WATER SERVICE WITH PLUMBING PLANS PRIOR TO CONSTRUCTION.

7
C12
SCHEMATIC IRRIGATION CONNECTION
NO SCALE

MARK	REVISION	DATE	BY

Engineer: EDH | Checked By: CHKD | Scale: 1" = N/A
Technician: RMD | Date: 08/01/2025 | T-R-S: 75N-44W-21
Project No: 125.0711.10 | Sheet C12

THE RESIDENCE AT CARTER LAKE
CARTER LAKE, IOWA
DETAILS

SNYDER & ASSOCIATES, INC.
231 BENNETT AVENUE
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712-322-3202 | www.snyder-associates.com
SNYDER & ASSOCIATES

Project No: 125.0711.10
Sheet C12

Storm Water Pollution Prevention Plan (SWPPP)

Prepared for:

Quick Current Broadband-Iowa LLC.
1302 East Locust Street
Carter Lake, Iowa 51510

SCS ENGINEERS

27225278.00 | September 2025

14755 Grover Street
Omaha, Nebraska 68144
(402) 938-0326

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Figures

Appendices

STORM WATER POLLUTION PREVENTION PLAN CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for known violations."

Signature: [signature]

Name: Ruben Zendejas

Title: General Manager

Company: Quick Current - Iowa

Date: 9-3-25

Address of Plan: 1302 East Locust Street, Carter Lake, Iowa 51510

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STORM WATER POLLUTION PREVENTION PLAN TASK SUMMARY AND REVIEW/REVISION LOG

The following activities shall be completed by the Pollution Prevention Team following the schedule listed below.

SWPPP Task Summary

Activity Description	Schedule	Applicable Plan Section
Routine Site Inspection	Once every 7 calendar days	5.0

SWPPP Review and Revision Log

Date	Review/Revision Performed by	Comments/Changes Made
September 2025	SCS Engineers	New SWPPP created.

Date	Review/Revision Performed by	Comments/Changes Made

1.0 OVERVIEW

1.1 INTRODUCTION

SCS Engineers (SCS), on behalf of Quick Current Broadband-Iowa LLC., has prepared this Storm Water Pollution Prevention Plan (SWPPP) for Quick Current Broadband- Iowa LLC. (Site, site, Facility) to satisfy the requirements for coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit No. 2 for storm water discharges to waters of the State of Iowa.

A copy of General Permit No. 2 is included in **Appendix A**. Currently the site is covered under General Permit No. 2 for storm water discharge associated with industrial activity for construction activities. A public notice as specified in 567 IAC 64.6(1)"*c*"(1) was published in the Omaha World Herald on August 30, 2025. A copy of the Proof for publication is include as **Appendix B**.

This SWPPP covers the operations at the site that is located at 1302 Locust Street, Carter Lake, Iowa. See **Figure 1** for the Site Vicinity Map. It has been developed in general accordance with the DNR NPDES General Permit No. 2 for storm water discharges associated construction activities and in accordance with good engineering practices.

This SWPPP describes the site and its operations, identifies potential sources of storm water pollution at the site, identifies best management practices (BMPs) or pollution control measures implemented to reduce the discharge of pollutants in storm water runoff. Additionally, the SWPPP describes the implementation of practices which will be used to reduce the pollutants in storm water discharge associated for construction activities at the construction site.

This SWPPP will be amended whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to the water of the U.S. or if the SWPPP proves to be ineffective in achieving the general objectives of controlling pollutants in storm water discharges associated with industrial activity from construction activities at this site.

1.2 GENERAL FACILITY INFORMATION

The general information of the site is summarized as follows:

<u>General Facility Information</u>

Name of Facility:	<u>Quick Current Broadband – Iowa LLC.</u>
Facility Address:	<u>1302 Locust Street</u> <u>Carter Lake, Iowa 51510</u>
Facility Contact	
Name:	<u>Ruben Zendejas</u>
Title:	<u>General Manager</u>
Telephone:	<u>(402) 214-7358</u>
Mailing Address:	<u>101 Main Street</u> <u>Macy, Nebraska 68039</u>
Owner:	<u>Quick Current Broadband – Iowa LLC.</u>

Permit Information

Type:	☒ Construction ☐ Individual
Designated Name:	Storm Water Discharge Associated with Construction Activities
Permit Number:	
Effective Date of Coverage:	August 30, 2025 through August 29, 2026
Number of Storm Water Outfalls:	1
Receiving Waters:	Missouri River and tributaries

Emergency Contact & Responsible Person

Name:	Kenny Robertson
Role & Company	Director of Construction Operations, Evolve Cellular
Telephone:	816-541-1429

Backup Emergency Contact

Name:	Ruben Zendejas
Telephone:	(402) 214-7538

1.3 OBJECTIVES

The goal of the storm water permit program is to improve the quality of surface waters by reducing the amount of pollutants potentially contained in the storm water runoff being discharged. Construction projects subject to an NPDES permit must prepare and implement an SWPPP for their facility.

The objective of this SWPPP is three-fold:

1. To identify potential sources of pollution at the site;
2. To describe BMPs that are to be used at the site;
3. To provide other elements such as a site inspection program, record keeping and a reporting program that will assist in compliance with the terms and conditions of General Permit No. 2.

2.0 SITE EVALUATION AND DESIGN DEVELOPMENT - PART IV.D.1

2.1 SITE INFORMATION

QC Broadband is developing the construction area to be used as an electronic data center for the company. The project will result in the construction of 1 building in the same common plan of development.

The site area is approximately 10 acre parcel located northwest of North 13th Street and East Locust Street in Carter Lake, Iowa in Pottawattamie County. Stormwater discharge will be located in W1/4, Section 21, Township 75N, Range 44W, Pottawatomie County. The general site and vicinity are shown on the Site Map included as **Figure 1**. The construction area is currently vegetated with grass and an undeveloped concrete slab that was previously used for parking.

Soil from excavation and fill will be managed and maintained by the General Contractor and/or their subcontractors. A summary of the existing soils within the construction area defined by the United States Department of Agriculture is identified in **Appendix C.** General Permit No. 2 requires that topsoil be preserved on construction sites.

The existing soils are categorized as “Lawns - Coarse Textured Soils” with an expected runoff coefficient equal to 0.10.

The receiving waters for stormwater runoff generated by the site will be the Missouri River via the storm sewer system. The closes storm sewer intake structure on the northeast corner of N 13th Street and E Locust Street. There are no non-allowable non-stormwater discharges expected to be present during construction.

Discharges from firefighting activities, fire hydrant flushings, waters used to wash vehicles in accordance with Part III.C. and Part IV.D.2.C.(2). of the IDNR NPDES General Permit No. 2, potable water sources including waterline flushings, irrigation drainage, routine external building washdown which does not use detergents, pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used, air conditioning condensate, springs, uncontaminated groundwater, and foundation or footing drains where flows are not contaminated with process materials such as solvents, may be authorized by this permit provided the non-storm water component of the discharge is in compliance with Part IV.D.5. of this permit.

Construction activities on this project will begin on August 30, 2025. All Construction activities shall be completed by August 29, 2025.

2.2 CONSTRUCTION ACTIVITIES

2.2.1 Excavation of Soil and Concrete

Excavation activities will generally begin at the city road right-of way adjacent to East Locust Street and continue northward to the approximate location of the current parking lot entrance off of North 13th Street. The approximate area of excavation will be roughly 50 feet wide east to west and approximately 100 feet from north to south.

The planned excavation area is shown on **Figure 2.** Based on the recent groundwater elevation data, the excavation should encounter groundwater at approximately 12.5 feet below grade. The excavation will not extend below the top of the current groundwater level. No excavation dewatering is planned for this construction site. The expected volume of excavation for soil is approximately 2,900 cubic yards. The expected volume of excavation for concrete is approximately 100 cubic yards.

The General Contractor shall be responsible for backfilling all excavation material with appropriate backfill from an offsite source. The General contractor will be expected to maintain all areas of backfill are maintained and protected during the process.

Prior to excavation on site, the construction area shall be protected and secured with temporary chain link fencing around the perimeter of the property. Stormwater controls including silt fencing around the perimeter of the excavation area and filter socks to protect stormwater inlets shall be implemented and maintained by the Responsible Official or their designee throughout the duration of construction activities and until final stabilization is complete.

2.2.2 Site Grading

The general contractor and their subcontractors, if applicable, shall be responsible to maintaining the site grading to appropriately handle stormwater discharge in accordance with the Iowa NPDES General Permit #2 and all other local requirements.

Site grading shall be protected through the installation of stormwater BMPs including silt fencing and filter socks protecting stormwater inlet structures.

3.0 STORM WATER MANAGEMENT CONTROLS – PART IV.D.2

Storm water management controls, or BMPs, will continue to be implemented to reduce the amount of pollutants in storm water discharged from the site. The permit requires that different categories of BMPs be considered and selected where applicable.

3.1 SOIL STABILIZATION PRACTICES

The general contractor shall be responsible for all stabilization and restoration as a result of construction activities. Stabilization practices may include temporary or permanent seeding after germination and establishment of vegetative cover of sufficient density and height to preclude erosion has been achieved. Other stabilization practices include but are not limited to mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures to prevent erosion.

Stabilization practices and activities shall implemented in accordance with IDNR GP #2 and at a minimum whenever clearing, grading, excavating, or other earth disturbing activities have permanently ceased on any portion of the site or temporarily cease on any portion of the site and will not resume for a period exceeding 14 calendar days.

3.2 STRUCTURAL PRACTICES

Structural practices to limit stormwater pollutants including mobilized sediment, trash, and other potential byproducts of construction shall be installed by the General Contractor. At a minimum the contractor shall install perimeter silt fencing around the property with additional silt fencing installed around the excavation area. Silt fencing shall be inspected and maintained by the general contractor throughout the duration of permit coverage.

The general contractor shall implement all other structural practices as described in Part IV.D.2.A.2 where applicable and appropriate.

3.3 PERIMETER CONTROLS

The general contractor shall be responsible for securing and protecting the construction activity from unauthorized personnel. A perimeter chain link fence shall be installed and locked to limit access to the construction area throughout the duration of construction activities on site.

Offsite vehicle tracking of sediments shall be minimized through routine inspection, maintenance and cleaning as needed. It shall be the responsibility of the general contractor to routinely inspect and maintain all entrances and exits from the property. The use of a stabilization rock exit or wheel well washing unit may be required if routine inspection and maintenance are not sufficient.

Storm sewer inlet structures shall be protected using sediment filter socks. Filter socks shall be installed at all storm water inlet structures surrounding the construction area.

3.4 OTHER CONTROLS

Other controls including waste disposal shall be the responsibility of the general contractor. Waste and other construction debris shall be disposed of properly throughout the duration of the construction project. Municipal solid waste (MSW) and construction and demolition (C&D) waste shall be disposed of in separate containers. The solid waste containers onsite will be covered when not actively loading material and especially during precipitation events. No building material wastes, or unused materials shall be buried, dumped, or discharged at the site.

The general contractor shall be responsible for the implementation and maintenance of all spill responses occurring at the construction site throughout the duration of the project. The general contractor shall assign appropriate personnel on spill response procedures and prevention methods needed to control potential spills from onsite storage units and equipment.

4.0 STORM WATER CONTROL MAINTENANCE – PART IV.D.3

The general contractor or their designee will be responsible for maintaining all control measures and BMPs throughout the duration of the construction project. All stormwater controls, soil stabilization practices, and perimeter controls shall be maintained to function properly.

5.0 ROUTINE INSPECTIONS – PART IV.D.4

Qualified personnel shall inspect all disturbed areas of the construction site that have not been stabilized with perennial, vegetative cover of sufficient density to preclude erosion at least once every seven calendar days. Unless erosion is evident or other conditions warrant them, regular inspections are not required on areas that have been stabilized with perennial vegetative cover of sufficient density to preclude erosion.

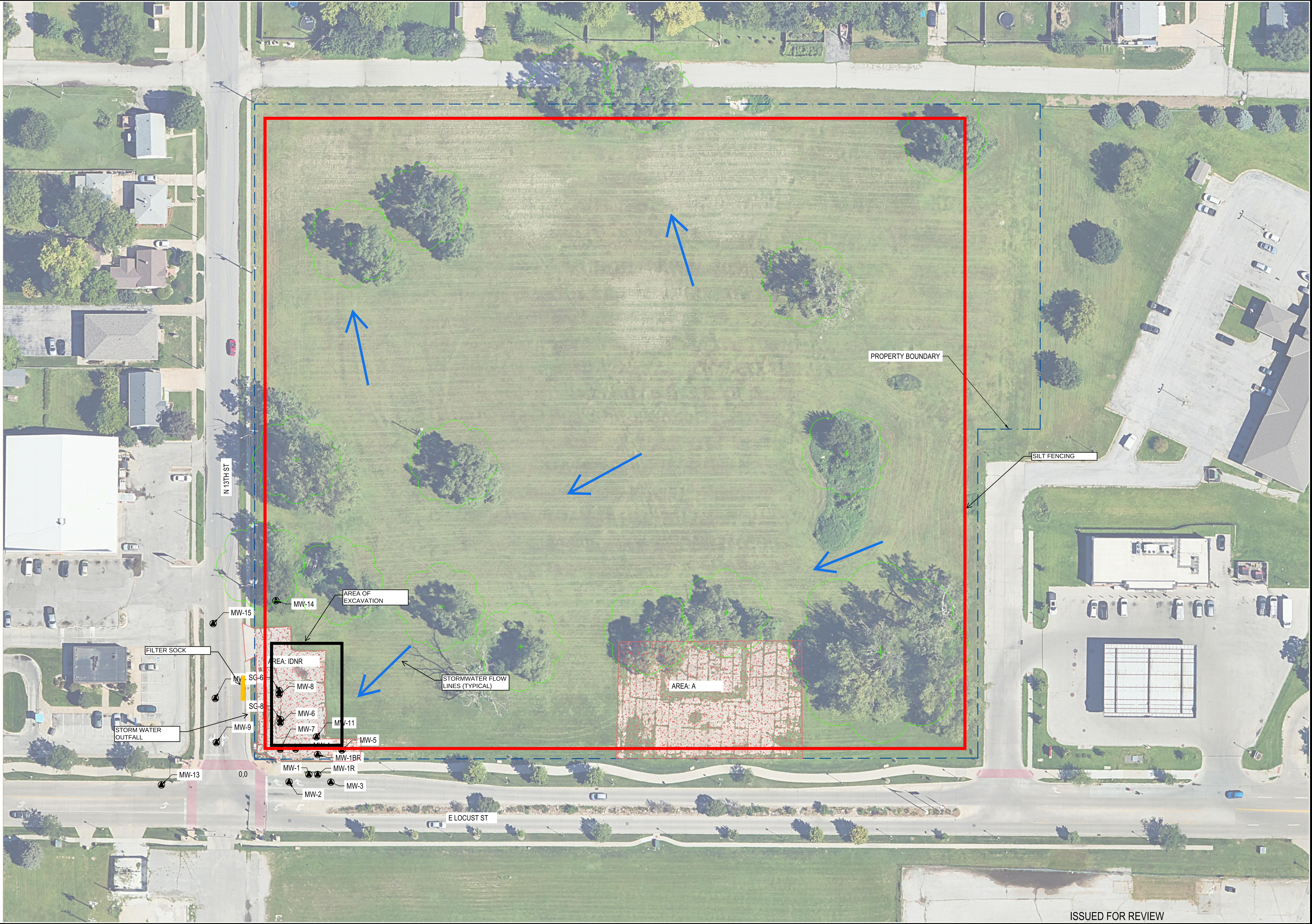
Disturbed areas and areas used for storage of material and equipment that are exposed to precipitation shall be inspected for evidence of or the potential for pollutants entering the drainage system. Storm water controls shall also be inspected to maintain proper functionality as designed.

Other locations to be inspected shall include where vehicles enter and exit the site and other perimeter controls.

Based on the results of the inspection, the storm water pollution prevention measures identified in the SWPPP shall be revised at the construction site as appropriate and as soon as practicable after the inspection. Any modifications and maintenance activities shall be completed within 72 hours of the inspection. Modifications to the SWPPP necessary as a result from storm water inspections shall be completed with 7 calendar days of the inspection.

Storm water inspections shall be retained onsite as part of the SWPPP for at least 3 years after final stabilization has been achieved and an NOD has been submitted to the Department. Storm water inspections shall include a summary of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWPPP, and actions taken in accordance with Part IV.D.4.b. of this permit.

Figure



ISSUED FOR REVIEW

T:\27224580.00\AUTOCAD\SHEETS\1 SITE LAYOUT.DWG

REV.	DATE	CK. BY
	-	-
	-	-
	-	-
	-	-
	-	-
	-	-

SHEET TITLE
SITE LAYOUT

PROJECT TITLE
1302 LOCUST ST, CARTER LAKE IOWA
QC BROADBAND CAD MODEL

CLIENT
QUICK CONNECT BROADBAND
101 MAIN ST
MACY, NE

SCS ENGINEERS
14755 GROVER STREET
OMAHA, NE 68144
PH. (402) 884-6202 FAX. (913) 681-0012
AUTHORIZATION NUMBER: CA-0543

PROJ. NO. 27224580.00	DWN. BY: GJC	
DSN. BY: GJC	CHK. BY: CGJ	PROJ. MGR CGJ

CADD FILE:
1 SITE LAYOUT.DWG

DATE: 1/29/25

DRAWING NO.
1

Appendix A

Copy of Iowa DNR NPDES General Permit No. 2

IOWA DEPARTMENT OF NATURAL RESOURCES

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

GENERAL PERMIT NO. 2

EFFECTIVE DATES

MARCH 1, 2023 THROUGH FEBRUARY 29, 2028

FOR

STORM WATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES

NPDES GENERAL PERMIT NO. 2
TABLE OF CONTENTS

PART I. COVERAGE UNDER THIS PERMIT

A. PERMIT AREA

This permit covers all areas of the State of Iowa.

B. ELIGIBILITY

1. **Authorizations.**
   - **a.** Except for discharges identified under Parts I.B.2. and I.B.3., this permit may authorize the discharge of storm water associated with industrial activity from construction sites, (those sites or common plans of development or sale that will result in the disturbance of one or more acres total land area, including the disturbance of less than one acre of total land area that is a part of a larger common plan of development or sale if the larger common plan will ultimately disturb one acre or more), (hereafter referred to as storm water discharge associated with industrial activity for construction activities), occurring after the effective date of this permit (including discharges occurring after the effective date of this permit where the construction activity was initiated before the effective date of this permit), including storm water discharge associated with industrial activity from areas that are dedicated to producing earthen materials, such as soils, sand and gravel, for use at a single construction site. This permit may also authorize areas where soil is placed permanently or temporarily, also known as fill sites.
   - **b.** This permit may authorize storm water discharge from a construction site that is mixed with storm water discharge associated with industrial activity from sources other than construction activities provided that the storm water discharge from the industrial (non-construction) source is in compliance with the terms of a NPDES general permit, other than this general permit, or an individual permit authorizing such discharge. In addition, the storm water other than from construction shall be in compliance with Part IV.D.6. of this permit.
2. **Limitations on Coverage.** The following discharges associated with industrial activity for construction activities are NOT authorized by this permit:
   - **a.** storm water discharges that are mixed with sources of non-storm water other than discharges identified in Part III.A.2. of this permit;
   - **b.** storm water discharges associated with industrial activity for construction activities which are covered by an existing individual NPDES permit or which are issued a permit in accordance with Part I.C. of this permit. Storm water discharges authorized by an existing individual NPDES permit will be eligible to apply for coverage under this general permit as the existing individual permit expires;
   - **c.** storm water discharges associated with industrial activity for construction activities that the Iowa Department of Natural Resources has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard;
   - **d.** new or expanded storm water discharge associated with industrial activity that discharges to Outstanding Iowa Waters or to Outstanding National Resource Waters; and
   - **e.** discharges from concrete washout activities and from wet sawing of concrete. Waste from concrete washout and wet sawing of concrete is not allowed to be discharged to surface waters and is not allowed to adversely affect a water of the state.
3. **Exclusions.** The following storm water discharges associated with industrial activity from construction activities do not require a NPDES permit: discharges from soil disturbing activities from sites where less than 5 acres is disturbed and the soil disturbing activities are due to routine maintenance that is performed to maintain the original line and grade, hydraulic capacity or original purpose of the site and discharges from agricultural and silvicultural activities including storm water runoff from orchards, cultivated crops, pastures, range lands, and forest lands, but not discharges from concentrated animal feeding operations as defined in 40 CFR Section 122.23, concentrated aquatic production facilities as defined in 40 CFR Section 122.24, discharges to aquaculture projects as defined in 40 CFR Section 122.25, and discharges from silvicultural point sources as defined in 40 CFR Section 122.27.

C. <u>REQUIRING AN INDIVIDUAL PERMIT</u>

1. The Department may require any person authorized by this permit to apply for and obtain an individual NPDES permit. The Department may require any owner or operator authorized to discharge under this permit to apply for an individual NPDES permit only if the owner or operator has been notified in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the owner or operator to file the application, and a statement that on the effective date of the individual NPDES permit, coverage under this general permit shall automatically terminate. If an owner or operator fails to submit an individual NPDES permit application required by the Department under this paragraph, coverage of this general permit automatically is terminated at the end of the day specified for submittal of the individual NPDES application.
2. Any person authorized to discharge under this permit may apply for an individual NPDES permit. In such cases, the discharger shall submit the following in accordance with the requirements of subrule 567 IAC 64.3(4):
   a. an individual application, using industrial application Form 1, Form 2F, and Form 5; and,
   b. all applicable fees identified in rule 567 IAC 64.16.
3. When an individual NPDES permit is issued to a discharger covered under this general permit, the applicability of this general permit to the individual NPDES permittee is automatically terminated on the effective date of the individual NPDES permit. When an individual NPDES permit is denied to a discharger otherwise subject to this permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by the Department.

D. <u>AUTHORIZATION</u>

A discharger must submit a Notice of Intent (NOI) in accordance with the requirements of Part II of this permit in order for storm water discharge associated with industrial activity for construction activities pursuant to Part I.B. of this permit to be authorized to discharge under this general permit.

PART II. NOTICE OF INTENT (NOI) REQUIREMENTS

A. <u>DEADLINES FOR NOTIFICATION</u>

For storm water discharge associated with industrial activity for construction activities, such activities shall not commence until an authorization has been issued for the project by the Department.

B. <u>FAILURE TO NOTIFY</u>

Dischargers who fail to notify the Department of their intent to be covered, and discharge pollutants to water of the United States within Iowa, without an NPDES permit, are in violation of the CWA and the Code of Iowa.

C. <u>CONTENTS OF AN NOI</u>

A complete NOI shall include the items described in Parts II.C.1., II.C.2., and II.C.3. of this permit.

1. A completed NOI form, DNR Form 542-1415, signed in accordance with Parts VI.H. and VI.I of this permit. The information on the form shall include all of the following:
   a. Name, address, and location of the construction site for which this notification is submitted. The location shall be provided as the 1/4 section (NE, SE, SW, NW), township, range, and county where the storm water discharge is located;
   b. The owner’s name, address, telephone number, and status (federal, state, private, public or other entity);
   c. The name, address and telephone number of any operator (contractor) that has been identified as having a role in the storm water pollution prevention plan (SWPPP) for the site required under Part IV.D.7. of this permit. Contractors (operators) identified after the submittal of the completed NOI shall be identified in the SWPPP;
   d. The type of discharge (new or existing as related to October 1, 1992); whether or not the discharge is to a municipal separate storm sewer system; the date the discharge is to commence; the permit status of the discharge; and, the name of the receiving water(s);

e. An indication if any existing quantitative data is available describing the concentration of pollutants in storm water discharges. Existing data should not be included as part of the NOI, it should be retained as part of the SWPPP;

f. A brief description of the project; an estimated timetable for major activities; and, an estimate of the number of acres of the site on which soil will be disturbed; and

g. A certification that compliance with g.(1). through g.(4). are met:

g.(1). the SWPPP has been developed before the NOI is submitted to the Department;

g.(2). the SWPPP will be implemented on October 1, 1992 for any existing storm water discharge associated with industrial activity for construction activities. For a storm water discharge associated with industrial activity for construction activities that commence after October 1, 1992, the SWPPP shall be implemented with the start of construction activities;

g.(3). the NOI will be included and incorporated into the SWPPP and will be updated as required; and,

g.(4). the SWPPP provides compliance with Iowa Code section 161A.64 and local sediment and erosion plans and are consistent with the requirements of Part IV of this general permit.

2. **Applicable Fees.** The applicable fees specified in 567 IAC 64.16.
3. **Public Notification.** A demonstration that the public notice specified in 567 IAC 64.6(1)"*c*"(1) was published at least one day in one newspaper with the largest circulation in the area in which the facility is located or the activity will occur.

D. WHERE TO SUBMIT

Facilities which discharge storm water associated with industrial activity for construction activities must submit items described in Part II.C. of this permit to the Department online at: https://programs.iowadnr.gov/stormwater/pages/home.aspx or by mail to the following address: Storm Water Coordinator, Iowa Department of Natural Resources, 502 E 9th St., Des Moines IA 50319-0034.

E. RENOTIFICATION

Prior to the expiration of an authorization issued under this general permit, the permittee is required to resubmit an NOI (no additional public notice is required) with the Department for coverage under the new general permit. If a new general permit has not been reissued prior to the expiration of the current permit, the provisions and coverage of the current permit are extended until replaced by the adoption of a new general permit.

F. TRANSFER OF COVERAGE UNDER THIS PERMIT

For storm water discharge associated with industrial activity for construction activities where the ownership changes, the Department must be notified of the title transfer within 30 days. Both the previous owner(s) and the new owner(s) are responsible for notifying the Department of the transfer and the new owner's name and contact information. This requirement shall be satisfied upon the Department's receipt of the notification of this information by either the previous owner(s) or the new owner(s).

If a storm water discharge associated with industrial activity for construction activities is covered by this general permit, the new owner(s) shall be subject to all terms and conditions of this general permit. A copy of the notice of transfer that was sent to the Department shall be included in the SWPPP.

For construction activity which is part of a larger common plan of development, such as a housing or commercial development project, if a permittee transfers ownership of all or any part of property subject to this permit, both the permittee and transferee shall be responsible for compliance with the provisions of this permit for that portion of the project which has been transferred including when the transferred property is less than one acre in area. If the new owner(s) agree in writing to be solely responsible for compliance with the provisions of this permit for the property which has been transferred, then the existing permittee(s) shall be relieved of responsibility for compliance with this permit for the transferred property, from and after the date the transfer of responsibility is signed. A copy of the notice of transfer of responsibility shall be included in the SWPPP.

G. NOTICE OF DISCONTINUATION (NOD)

1. Within 30 days after final stabilization at a construction site (as defined in Part VIII of this permit), the operator or owner of the facility shall submit a Notice of Discontinuation (NOD) to the Department.
2. A NOD shall include the following information:
   a. the name of the owner/operator to which the permit was issued;
   b. the general permit number and permit authorization number;
   c. the date the construction site reached final stabilization; and,
   d. the following certification signed in accordance with Part VI.H. of this permit:
   I certify under penalty of law that disturbed soils at the identified facility have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time. I understand that by submitting this Notice of Discontinuation, that I am no longer authorized to discharge storm water associated with industrial activity for construction activities by Iowa Department of Natural Resources General NPDES Permit No. 2. and that discharging pollutants from storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit.

PART III. SPECIAL CONDITIONS, MANAGEMENT PRACTICES, AND OTHER NON-NUMERIC LIMITATIONS

A. PROHIBITION ON NON-STORM WATER DISCHARGES

1. All discharges authorized by this permit shall be composed entirely of storm water except for non-storm discharges listed in Part III.A.2 of this permit.
2. Discharges from firefighting activities; fire hydrant flushings; waters used to wash vehicles in accordance with Part III.C. and Part IV.D.2.c.(2). of this permit; potable water sources including waterline flushings; irrigation drainage; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; uncontaminated groundwater; and foundation or footing drains where flows are not contaminated with process materials such as solvents; may be authorized by this permit provided the non-storm water component of the discharge is in compliance with Part IV.D.5. of this permit.

B. RELEASES IN EXCESS OF REPORTABLE QUANTITIES

Any owner or operator identified in the SWPPP is subject to the spill notification requirements as specified in Iowa Code 455B.386. Iowa law requires that as soon as possible but not more than six hours after the onset of a hazardous condition[1] the Department and local sheriff's office or the office of the sheriff of the affected county be notified.

The SWPPP described in Part IV of this permit must be modified within 7 calendar days of knowledge of the release to provide a description of the release and the circumstances leading to the release and to identify and provide for the implementation of steps to prevent the reoccurrence of such releases and to respond to such releases.

C. FEDERAL CONSTRUCTION AND DEVELOPMENT EFFLUENT GUIDELINES

In addition to all other requirements in this permit, all sites and activities required to be authorized under this permit shall comply with the following federal effluent guidelines as applicable to each site and activity.

1. **Erosion and Sediment Controls.** Design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants. At a minimum, such controls must be designed, installed and maintained to:
   a. Control storm water volume and velocity to minimize soil erosion in order to minimize pollutant discharges;
   b. Control storm water discharges, including both peak flow rates and total storm water volume, to minimize channel and streambank erosion and scour in the immediate vicinity of discharge points;
   c. Minimize the amount of soil exposed during construction activity;

[1] see Definitions, Part VIII

- **d.** Minimize the disturbance of steep slopes;
- **e.** Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting storm water runoff and soil characteristics including the range of soil particle sizes expected to be present on the site; and
- **f.** Provide and maintain natural buffers around waters of the United States, direct storm water to vegetated areas and maximize storm water infiltration to reduce pollutant discharges, unless infeasible.

2. Soil Compaction and Topsoil Preservation. Practices to minimize soil compaction and preserve topsoil shall be implemented as described in Part IV.D.2.a.(2).iii. of this permit.

3. Soil Stabilization. Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating or other earth disturbing activities have permanently ceased on any portion of the site or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. In drought-stricken areas and areas that have recently received such high amounts of rain that seeding with field equipment is impossible and initiating vegetative stabilization immediately is infeasible, alternative stabilization measures must be employed as specified by the Department. In limited circumstances, stabilization may not be required if the intended function of a specific area of the site necessitates that it remain disturbed.

4. Dewatering. Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls.

5. Pollution Prevention Measures. Design, install, implement and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented and maintained to:

- **a.** Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
- **b.** Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and storm water. Minimization of exposure is not required in cases where the exposure to precipitation and to storm water will not result in a discharge of pollutants, or where exposure of a specific material or product poses little risk of storm water contamination (such as final products and materials intended for outdoor use); and
- **c.** Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.

6. Prohibited Discharges. The following discharges are prohibited:

- **a.** Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
- **b.** Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance; and
- **c.** Soaps or solvents used in vehicle and equipment washing.

7. Surface Outlets. When discharging from basins and impoundments, utilize outlet structures that withdraw water from the surface, unless infeasible.

PART IV. STORM WATER POLLUTION PREVENTION PLANS (SWPPP)

A storm water pollution prevention plan (SWPPP) shall be developed for each construction site covered by this permit. SWPPPs shall be prepared in accordance with good engineering practices. The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of the storm water discharge from the construction activities. In addition, the SWPPP shall describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water discharge associated with industrial activity for construction activities at the construction site and to assure compliance with the terms and conditions of this permit. Facilities must implement the provisions of the SWPPP required under this part as a condition of this permit.

A. DEADLINES FOR SWPPP PREPARATION AND COMPLIANCE

1. **SWPPP Preparation Deadline.** The SWPPP shall be completed prior to the submittal of a NOI to the Department to be covered under this permit and shall be updated as appropriate.
2. **SWPPP Compliance Deadline**. The SWPPP shall provide for compliance with the terms and schedule of the SWPPP prior to the initiation of construction activities.

B. SIGNATURE AND SWPPP REVIEW

1. The SWPPP shall be signed in accordance with Part VI.H. of this permit.
2. The permittee shall make SWPPPs available to the Department upon request; or in the case of a storm water discharge associated with industrial activity for construction activities that discharges through a municipal separate storm sewer system with an NPDES permit, shall make the SWPPP available to the municipal operator of the system.
3. The Department may notify the permittee at any time that the SWPPP does not meet one or more of the minimum requirements of this Part. After such notification from the Department, the permittee shall make changes to the SWPPP and shall submit to the Department a written certification that the requested changes have been made. Unless otherwise provided by the Department, the permittee shall have 3 business days after such notification to make the necessary changes.
4. All SWPPPs received by the Department from the permittee are considered reports that shall be available to the public under Section 308(b) of the CWA and Iowa Code Chapter 22. However, the permittee may claim any portion of a SWPPP as confidential in accordance with Iowa Code Chapter 22 and 561 IAC 2.5.

C. KEEPING SWPPPS CURRENT

The permittee shall amend the SWPPP whenever any of the following occurs: (1) there is a change in design, construction, operation, or maintenance, that has a significant effect on the potential for the discharge of pollutants to the waters of the U.S. and which has not been addressed in the SWPPP; or (2) if the SWPPP proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified in Part IV.D.2. of this permit, or (3) the SWPPP fails to otherwise achieve the general objectives of controlling pollutants in storm water discharge associated with industrial activity for construction activities. In addition, the SWPPP shall be updated to: expeditiously change the site map to include changes at the site, including contractors identified after the submittal of the NOI as Co-permittees, described in Part IV.D.7. of this permit; identify any change in ownership or transference of the permit and permit responsibilities; or, if required, by the occurrence of a hazardous condition (as defined in Part VIII of this permit). Amendments to the SWPPP may be reviewed by the Department in the same manner as Part IV.B.2 of this permit.

D. CONTENTS OF THE SWPPP

The SWPPP shall include the following items:

1. **Site Description.** Each SWPPP shall provide a description of the following:
   - **a.** a description of the nature of the construction activity;
   - **b.** estimates of the total area of the site and the area of the site that is expected to be disturbed by excavation, grading, or other activities;
   - **c.** an estimate of the runoff coefficient of the site after construction activities are completed and existing data describing the soil or the quality of any discharge from the site;
   - **d.** a site map indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, the location of structural and nonstructural controls identified in the SWPPP, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands), and locations where storm water is discharged to a surface water; and
   - **e.** the name of the receiving water(s) and the ultimate receiving water(s).
2. **Controls**. Each SWPPP shall include a description of controls that will be implemented at the construction site. The SWPPP will clearly describe the intended sequence of major activities and for each activity, the appropriate control measures and the timing during the construction process that the measures will be implemented. (For example, perimeter controls for one portion of the site will be installed after the clearing and grubbing

necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site. Perimeter controls will be actively maintained until final stabilization of those portions of the site upward of the perimeter control. Temporary perimeter controls will be removed after final stabilization). The description of controls shall address the following minimum components:

a. Erosion and Sediment Controls

a.(1). Stabilization Practices. A description of temporary and permanent stabilization practices, including site-specific scheduling of the implementation of the practices. Stabilization practices may include: temporary or permanent seeding after germination and establishment of vegetative cover of sufficient density and height to preclude erosion has been achieved, as well as mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Temporary or continued stabilization must be implemented and maintained when necessary to prevent erosion of seeded areas prior to the establishment of vegetative cover of sufficient density and height to preclude erosion.

a.(2). Structural Practices. A description of structural practices to the degree attainable, to divert flows from exposed soils, store flows or otherwise limit runoff from exposed areas of the site. Such practices may include silt fences, earth dikes, brush barriers, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions and temporary or permanent sediment basins. Structural practices should be placed on upland soils to the degree attainable. The installation of these devices may be subject to Section 404 of the CWA.

a.(2).i For common drainage locations that serve an area with more than 10 disturbed acres at one time, a temporary or permanent sediment basin providing 3,600 cubic feet of storage per acre drained shall be provided where attainable until final stabilization of the site has been achieved. The 3,600 cubic feet of storage area per acre drained does not apply to flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around the sediment basin. For drainage locations which serve more than 10 disturbed acres at one time and where a temporary sediment basin providing 3,600 cubic feet of storage per acre drained is not attainable, sediment traps, silt fences, or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area.

a.(2).ii For drainage locations serving 10 or fewer acres, sediment traps, silt fences or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area or a sediment basin providing for 3,600 cubic feet of storage per acre drained.

a.(2).iii Unless infeasible, the following measures shall be implemented at all sites: utilize outlet structures that withdraw water from the surface when discharging from basins, provide and maintain natural buffers around surface waters and direct storm water to vegetated areas to both increase sediment removal and maximize storm water infiltration.

The permittee(s) shall minimize soil compaction and, unless infeasible, preserve topsoil. “Infeasible” shall mean not technologically possible, or not economically practicable and achievable in light of the best industry practices. “Unless infeasible, preserve topsoil” shall mean that, unless infeasible, topsoil from any areas of the site where the surface of the ground for the permitted construction activities is disturbed shall remain within the area covered by the applicable General Permit No. 2 authorization. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted. Preserving topsoil is not required where the intended function of a specific area of the site dictates that the topsoil be disturbed or removed. The permittee(s) shall control storm water volume and velocity to minimize soil erosion in order to minimize pollutant discharges and shall control storm water discharges, including both peak flowrates and total storm water volume, to minimize channel and stream bank erosion and scour in the immediate vicinity of discharge points. An affidavit signed by the permittee(s) may be submitted to demonstrate compliance.

For construction activity which is part of a larger common plan of development, such as a housing or commercial development project, in which a new owner agrees in writing to be solely responsible for compliance with the provisions of this permit for the property which has been transferred or in which the new owner has obtained authorization under this permit for a lot or lots (as specified in subrule 567 IAC 64.6(6)), the topsoil preservation requirements described above must be met no later than at the time the lot or lots have reached final stabilization as described in this permit.

The topsoil preservation requirement described above shall be implemented for projects that have not received an authorization under this permit prior to October 1, 2012. The topsoil preservation requirements are not required to be implemented for projects that have been authorized prior to October 1, 2012. In residential and commercial developments, a plat is considered a project. For other large areas that have been authorized for multiple construction sites, including those to be started at a future date, such as those located at industrial facilities, military installations and universities, a new construction project not yet surveyed and platted out is considered a project. This stipulation is intended to be interpreted as requiring the topsoil preservation requirements on development plats and construction activities on other extended areas that may have several construction projects permitted under the same authorization to be implemented on those projects not yet surveyed and platted out prior to October 1, 2012 even if other plats and construction activities in the same development or other extended area were authorized prior to October 1, 2012.

b. **Storm Water Management.** A description of measures that will be installed during construction to control pollutants in storm water discharges that will occur after construction operations have been completed. The installation of these devices may be subject to Section 404 of the CWA. This permit only addresses the installation of storm water management measures and not the ultimate operation and maintenance of such structures after the construction activities have been completed and the site has undergone final stabilization. Permittees are only responsible for the installation and maintenance of storm water management measures prior to final stabilization of the site and are not responsible for maintenance after storm water discharges associated with industrial activity have been eliminated from the site.

b.(1). Such practices may include: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; and infiltration of runoff onsite; and sequential systems (which combine several practices). A goal of 80 percent removal of total suspended solids from those flows which exceed predevelopment levels should be used in designing and installing storm water management controls (where practicable). Where this goal is not met, the permittee shall provide justification for rejecting each practice based on site conditions.

b.(2). Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. maintenance of hydrologic conditions present prior to the initiation of construction activities).

c. **Other Controls.**

c.(1). **Waste Disposal.** All wastes composed of building materials must be removed from the site for disposal in permitted disposal facilities. No building material wastes or unused building materials shall be buried, dumped, or discharged at the site.

c.(2). Off-site vehicle tracking of sediments shall be minimized.

c.(3). The SWPPP shall ensure and demonstrate compliance with applicable State or local waste disposal, sanitary sewer or septic system regulations.

d. **Approved State or Local Plans**. A SWPPP that is submitted by a facility that discharges storm water associated with industrial activity for construction activities must include the procedures and requirements specified in any applicable sediment and erosion site plans or storm water management plans approved by State or local officials. Any requirements specified in sediment and erosion plans, site permits, or storm water management plans approved by State or local officials that are applicable to protecting surface water resources are, upon submittal of an NOI, incorporated by reference and are enforceable under this permit even if they are not specifically included in the SWPPP.

   Operators of facilities seeking alternative permit requirements shall submit an individual permit application in accordance with Part I.C.2. of this permit along with a description of why the requirements in approved State or local plans should not be applicable as a condition of an NPDES permit.

3. **Maintenance.** A description of procedures to maintain in good and effective operating conditions vegetation, erosion and sediment control measures and other protective measures identified in the site plan.
4. **Inspections.** Qualified personnel (provided by the discharger) shall inspect disturbed areas of the construction site that have not been stabilized with a perennial, vegetative cover of sufficient density to preclude erosion at least once every seven calendar days. Unless erosion is evident or other conditions warrant them, regular inspections are not required on areas that have been stabilized with a perennial, vegetative cover of sufficient density to preclude erosion.
   a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the SWPPP shall be observed to ensure that they are operating correctly. When discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.
   b. Based on the results of the inspection, the storm water pollution prevention measures identified in the SWPPP shall be revised at the construction site as appropriate as soon as practicable after the inspection and added to the SWPPP within 7 calendar days of the inspection. If the permittee determines that making these changes at the construction site within 72 hours of the inspection is impracticable, the permittee shall document in the SWPPP why it is impracticable and indicate an estimated date by which the changes will be made.
   c. A report shall be made and retained as part of the SWPPP for at least three years after final stabilization has been achieved and a NOD has been submitted to the Department. The report shall be signed in accordance with Part VI.H. of this permit. The report shall contain the following: a summary of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWPPP and actions taken in accordance with Part IV.D.4.b. of this permit.
5. **Non-Storm Water Discharges.** Sources of non-storm water listed in Part III.A.2. of this permit that are combined with storm water discharges associated with industrial activity from construction activities must be identified in the SWPPP. Flows from firefighting activities are exempt from this requirement. The SWPPP shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.
6. **Additional Requirements for Storm Water Discharge from Industrial Activities Other than Construction, Including Dedicated Asphalt Plants and Dedicated Cement Plants.** This permit may only authorize a storm water discharge associated with industrial activity from a construction site that is mixed with a storm water discharge from an industrial source other than construction, where all of the following conditions are met:
   a. the industrial source other than construction is located on the same site as the construction activity;
   b. storm water discharges associated with industrial activity from the areas of the site where construction activities are occurring are in compliance with the terms of this permit; and,
   c. storm water discharges associated with industrial activity from the areas of the site where industrial activity other than construction are occurring (including storm water discharges from dedicated asphalt plants and dedicated cement plants) are in compliance with the terms and conditions, including applicable NOI or

application requirements, of a different NPDES general permit or individual permit authorizing such discharges.

7. **Contractors.**
   a. The SWPPP must clearly identify, for each measure in the SWPPP, the contractor(s) and/or subcontractor(s) that will implement the measure. All contractors and subcontractors identified in the SWPPP must sign a copy of the certification statement in Part IV.D.7.b. of this permit in accordance with Part VI.H. of this permit. Upon signing the certification, the contractor or sub-contractor is a co-permittee with the owner and other co-permittee contractors. All certifications must be included in the SWPPP.
   b. **Certification Statement.** All contractors and subcontractors identified in a SWPPP in accordance with Part IV.D.7.a. of this permit shall sign a copy of the following certification statement before conducting any professional service at the site identified in the SWPPP:
   I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site as part of this certification. Further, by my signature, I understand that I am a co-permittee, along with the owner(s) and other contractors and subcontractors signing such certifications, to the Iowa Department of Natural Resources NPDES General Permit No. 2 for Storm Water Discharge Associated with Industrial Activity for Construction Activities at the identified site. As a co-permittee, I understand that I, and my company, are legally required under the Clean Water Act and the Code of Iowa, to ensure compliance with the terms and conditions of the storm water pollution prevention plan (SWPPP) developed under this NPDES permit and the terms of this NPDES permit.
   The certification must include the following:
   b.(1). The name and title of the person providing the signature;
   b.(2). The name, address and telephone number of the contracting firm;
   b.(3). The address (or other identifying description) of the site; and
   b.(4). The date the certification is made.

PART V. RETENTION OF RECORDS

A. For a period of at least three years from the date of the document or the date the site is finally stabilized and a NOD has been submitted, the permittee shall retain copies of SWPPPs, all reports required by this permit, and all records used to complete the NOI.

B. If there is a construction trailer, shed or other covered structure located on the property, the permittee shall retain a copy of the SWPPP required by this permit at the construction site from the date of project initiation to the date of final stabilization. If there is no construction trailer, shed or other covered structure located on the property, the permittee shall retain a copy of the SWPPP from the date of project initiation to the date of final stabilization at a readily available alternative site approved by the Department and provide it for inspection upon request. If the SWPPP is maintained at an off-site location such as a corporate office, it shall be provided for inspection no later than three hours after being requested.

C. ADDRESSES
All written correspondence to the Department shall be emailed to npdes.mail@dnr.iowa.gov or mailed to the following address: Storm Water Coordinator, Iowa Department of Natural Resources, 502 E 9th St., Des Moines IA 50319-0034.

PART VI. STANDARD CONDITIONS

A. ADMINISTRATIVE RULES
Rules of the Department that govern the operation of a facility in connection with this permit are published in volumes 561 and 567 of the IAC. Reference to the term “rule” in this permit means the designated provision of volume 561 or 567.

B. DUTY TO COMPLY

1. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Iowa Code and the CWA and is grounds for enforcement action; for termination of coverage under this general permit; or, for denial of a request for coverage under a reissued general permit. Coverage under this general permit does not relieve the permittee of the responsibility to comply with all local, state and federal laws, ordinances, regulations or other legal requirements.
2. **Toxic Pollutants.** The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

C. CONTINUATION OF THE EXPIRED GENERAL PERMIT

This permit expires on February 29, 2028. An expired general permit continues in force until replaced by adoption of a new general permit.

D. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

E. DUTY TO MITIGATE

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. DUTY TO PROVIDE INFORMATION

The permittee shall furnish to the Department, within three hours, any information which the Department may request to determine compliance with this permit. The permittee shall also furnish to the Department upon request copies of records required to be kept by this permit.

G. OTHER INFORMATION

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the NOI or in any other report to the Department, he or she shall promptly submit such facts or information.

H. SIGNATORY REQUIREMENTS

All NOIs, NODs, SWPPPs, reports, certifications, or information either submitted to the Department or the operator of a municipal separate storm sewer system, or that this permit requires be maintained by the permittee, shall be signed in accordance with subrule 567 IAC 64.3(8) as follows:

64.3(8) *Identity of signatories of operation permit applications.* The person who signs the application for an operation permit shall be:

- **a.** *Corporations*. In the case of corporations, a responsible corporate officer. A responsible corporate officer means: (1) A president, secretary, treasurer, or vice-president in charge of a principal business function or any other person who performs similar policy or decision-making functions; or (2) The manager of manufacturing, production, or operating facilities if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- **b.** *Partnerships*. In the case of a partnership, a general partner.
- **c.** *Sole proprietorships*. In the case of a sole proprietorship, the proprietor.
- **d.** *Municipal, state, federal, or other public agency.* In the case of a municipal, state, or other public facility, either the principal executive officer or the ranking elected official. A principal executive officer of a public

agency includes: (1) The chief executive officer of the agency; or (2) A senior executive officer having responsibility for the overall operations of a unit of the agency.

e. *Storm water discharge associated with industrial activity from construction activities*. In the case of a storm water discharge associated with construction activity, either the owner of the site or the general contractor.

The person who signs NPDES reports shall be the same, except that in the case of a corporation or a public body, monitoring reports required under the terms of the permit may be submitted by the person who is responsible for the overall operation of the facility from which the discharge originated.

I. CERTIFICATION

Any person signing documents required by this permit shall make the following certification:
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for known violations.

J. OIL AND HAZARDOUS SUBSTANCE LIABILITY

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under section 311 of the CWA.

K. PROPERTY RIGHTS

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

L. SEVERABILITY

The provisions of this permit are severable. If any provision of this permit is found to be invalid by this Department or a court of law, such a determination shall not affect validity or enforceability of any other permit term or part. Additionally, if the application of any provision to a particular circumstance is found to be invalid by the Department or a court of law, such a determination shall not affect the validity or enforceability of said provision to other circumstances.

M. TRANSFERS

This permit is not transferable to any person except after notice to the Department. The Department may require the discharger to apply for and obtain an individual NPDES permit as stated in Part I.C of this permit.

N. PROPER OPERATION AND MAINTENANCE

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of SWPPPs. Adequate laboratory controls and appropriate quality assurance procedures shall be provided to maintain compliance with the conditions of this permit.

O. INSPECTION AND ENTRY

The permittee shall allow the Department or an authorized representative of EPA, the State, or, in the case of a facility which discharges through a municipal separate storm sewer, an authorized representative of the municipal operator or the separate storm sewer receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
2. Provide access to and copy at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), and
4. Sample or monitor, at reasonable times, to assure compliance or as otherwise authorized by the CWA.

P. PERMIT ACTIONS

Coverage under this permit may be terminated for cause. The filing of a request by the permittee for a permit discontinuance, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Q. ENVIRONMENTAL LAWS

No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

PART VII. REOPENER CLAUSE

If there is evidence indicating potential or realized impacts or water quality due to any storm water discharge associated with industrial activity for construction activities covered by this permit, the owner or operator of such discharge may be required to obtain individual permit in accordance with Part I.C of this permit.

PART VIII. DEFINITIONS

"*Best Management Practices*" or *"BMPs"* means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

*"**Construction site**"* means a site or common plan of development or sale on which construction activity, including clearing, grading and excavating, results in soil disturbance. A construction site is considered one site if all areas of the site are contiguous with one another and one entity owns all areas of the site.

"CFR" means the Code of Federal Regulations.

***"CWA"* or "*Clean Water Act*"** means the Federal Water Pollution Control Act.

"Dedicated portable asphalt plant" means a portable asphalt plant that is located on or contiguous to a construction site and that provides asphalt only to the construction site that the plant is located on or adjacent to.

"Dedicated portable concrete plant" means a portable concrete plant that is located on or contiguous to a construction site and that provides concrete only to the construction site that the plant is located on or adjacent to.

"Dedicated sand or gravel operation" means an operation that produces sand and/or gravel for a single construction project.

"Department" means the Iowa Department of Natural Resources.

"Final Stabilization" means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70%, sufficient to preclude erosion, for the entire disturbed area of the permitted project has been established or equivalent stabilization measures have been employed, or which is covered by a permanent structure that ensures the ground surface will not be eroded or otherwise impacted by precipitation or runoff, or which has been returned to agricultural production.

"Hazardous condition" means any situation involving the actual, imminent, or probable spillage, leakage, or release of a hazardous substance onto the land, into a water of the state, or into the atmosphere, which creates an immediate or potential danger to the public health or safety or to the environment. *Iowa Code § 455B.381(4)*

"Hazardous substance" means any substance or mixture of substances that presents a danger to the public health or safety and includes but is not limited to a substance that is toxic, corrosive, or flammable, or that is an irritant or that generates pressure through decomposition, heat, or other means. "Hazardous substance" may include any hazardous waste identified or listed by the administrator of the United State Environmental Protection Agency under the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976, or any toxic pollutant listed under section 307 of the federal Water Pollution Control Act as amended to January 1, 1977, or any hazardous substance designated under section 311 of the federal Water Pollution Control Act as amended to January 1, 1977, or any hazardous material designated by the secretary of transportation under the Hazardous Materials Transportation Act. *Iowa Code § 455B.381(5)*

"IAC" means the Iowa Administrative Code.

"Infeasible" means not technologically possible, or not economically practicable and achievable in light of best industry practices.

"Municipality" means a city, town, borough, county, parish, district, association, or other public body created by or under State law.

"NOD" means Notice of Discontinuation (see Part II.G. of this permit.)

"NOI" means Notice of Intent to be covered by this permit (see Part II of this permit.)

"Outstanding Iowa Waters" means those waters which constitute an outstanding state resource such as waters of exceptional recreational or ecological significance. These waters are identified in Appendix B of the Iowa Antidegradation Implementation Procedure manual.

"Outstanding National Resource Waters" means those waters which constitute an outstanding national resource such as waters of national and state parks and wildlife refuges and waters of exceptional recreational or ecological significance. These waters are identified in Appendix B of the Iowa Antidegradation Implementation Procedure manual.

"Permittee" means the owner of the facility or site.

"Qualified personnel" means those individuals capable enough and knowledgeable enough to perform the required functions adequately well to ensure compliance with the relevant permit conditions and requirements of the Iowa Administrative Code.

"Runoff coefficient" means the fraction of total rainfall that will appear at the conveyance as runoff.

"Stabilization"* or *"Soil Stabilization" means the prevention of soil particles from being dislodged and moving therefore preventing erosion from initiating or continuing.

"Storm Water" means storm water runoff, snow melt runoff, and surface runoff and drainage.

"***Storm water discharge associated with industrial activity***" means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NPDES program under 40 CFR Part 122. For the categories of industries identified in paragraphs (i) through (x) of this definition, the term includes, but is not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 CFR Part 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water.

For the purposes of this definition, material handling activities include the storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, final product, by-product, or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with storm water drained from the above described areas. Industrial facilities (including industrial facilities that are Federally, State, or municipally owned or operated that meet the description of the facilities listed in these paragraphs (i) to (xi) of this definition) include those facilities designated under 40 CFR Section 122.26(a)(1)(v). The following categories of facilities are considered to be engaging in "industrial activity" for purposes of this definition:

(i) Facilities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under 40 CFR Subchapter N (except facilities with toxic pollutant effluent standards which are exempted under paragraph (xi) of this definition);

(ii) Facilities classified within Standard Industrial Classification 24, Industry Group 241 that are rock crushing, gravel washing, log sorting, or log storage facilities operated in connection with silvicultural activities defined in 40 CFR Sections 122.27(b)(2)-(3) and Industry Groups 242 through 249; 26 (except 265 and 267), 28 (except 283), 29, 311, 32 (except 323), 33, 3441, 373; (not included are all other types of silviculture facilities);

(iii) Facilities classified as Standard Industrial Classifications 10 through 14 (mineral industry) including active or inactive mining operations (except for areas of coal mining operations no longer meeting the definition of a reclamation area under Section 40 CFR 434.11(1) because the performance bond issued to the facility by the appropriate SMCRA authority has been released, or except for areas of non-coal mining operations which have been released from applicable state or federal reclamation requirements after December 17, 1990) and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with, any overburden, raw material, intermediate products, finished products, by-products or waste products located on the site of such operations; (inactive mining operations are mining sites that are not being actively mined, but which have an identifiable owner/operator; inactive mining sites do not include sites where mining claims are being maintained prior to disturbances associated with the extraction, beneficiation, or processing of mined materials, nor sites where minimal activities are undertaken for the sole purpose of maintaining a mining claim);

(iv) Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under Subtitle C of the Resource Conservation and Recovery Act (RCRA);

(v) Landfills, land application sites, and open dumps that receive or have received any industrial wastes (waste that is received from any of the facilities described under this definition) including those that are subject to regulation under Subtitle D of RCRA;

(vi) Facilities involved in the recycling of materials, including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards, including, but not limited to, those classified as Standard Industrial Classifications 5015 and 5093;

(vii) Steam electric power generating facilities, including coal handling sites;

(viii) Transportation facilities classified as Standard Industrial Classifications 40, 41, 42 (except 4221-4225), 43, 44, 45 and 5171 which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or which are otherwise identified under paragraphs (i) to (vii) or (ix) to (xi) of this definition are associated with industrial activity;

(ix) Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 mgd or more, or required to have an approved pretreatment program under 40 CFR Part 403. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with section 405 of the CWA;

(x) Construction activity including clearing, grading and excavation, except operations that result in the disturbance of less than one acre of total land area. Construction activity also includes the disturbance of less than one acre of total land area that is a part of a larger common plan of development or sale if the larger common plan will ultimately disturb one acre or more;

(xi) Facilities under Standard Industrial Classifications 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31 (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39, and 4221-4225.

***"Storm water discharge associated with industrial activity for construction activities*"** means activities that fall under subparagraph (x) in the definition of storm water discharge associated with industrial activity.

***"SWPPP*"** means storm water pollution prevention plan.

"Topsoil" means the fertile, uppermost part of the soil containing significant organic matter largely devoid of debris and rocks and often disturbed in cultivation.

***"Uncontaminated groundwater*"** means water that is potable for humans, meets the narrative water quality standards in subrule 567 IAC 61.3(2), contains no more than half the listed concentration of any pollutants in subrule 567 IAC 61.3(3), has a pH of 6.5-9.0 and is located in soil or rock strata.

"Water(s) of the State" means any stream, lake, pond, marsh, watercourse, waterway, well, spring, reservoir, aquifer, irrigation system, drainage system and any other body or accumulation of water, surface or underground, natural or artificial, public or private which are contained within, flow through or border upon the State of Iowa or any portion thereof.

Appendix B

Notice of Intent and Discharge Authorization

Appendix C

Soils Report

United States Department of Agriculture

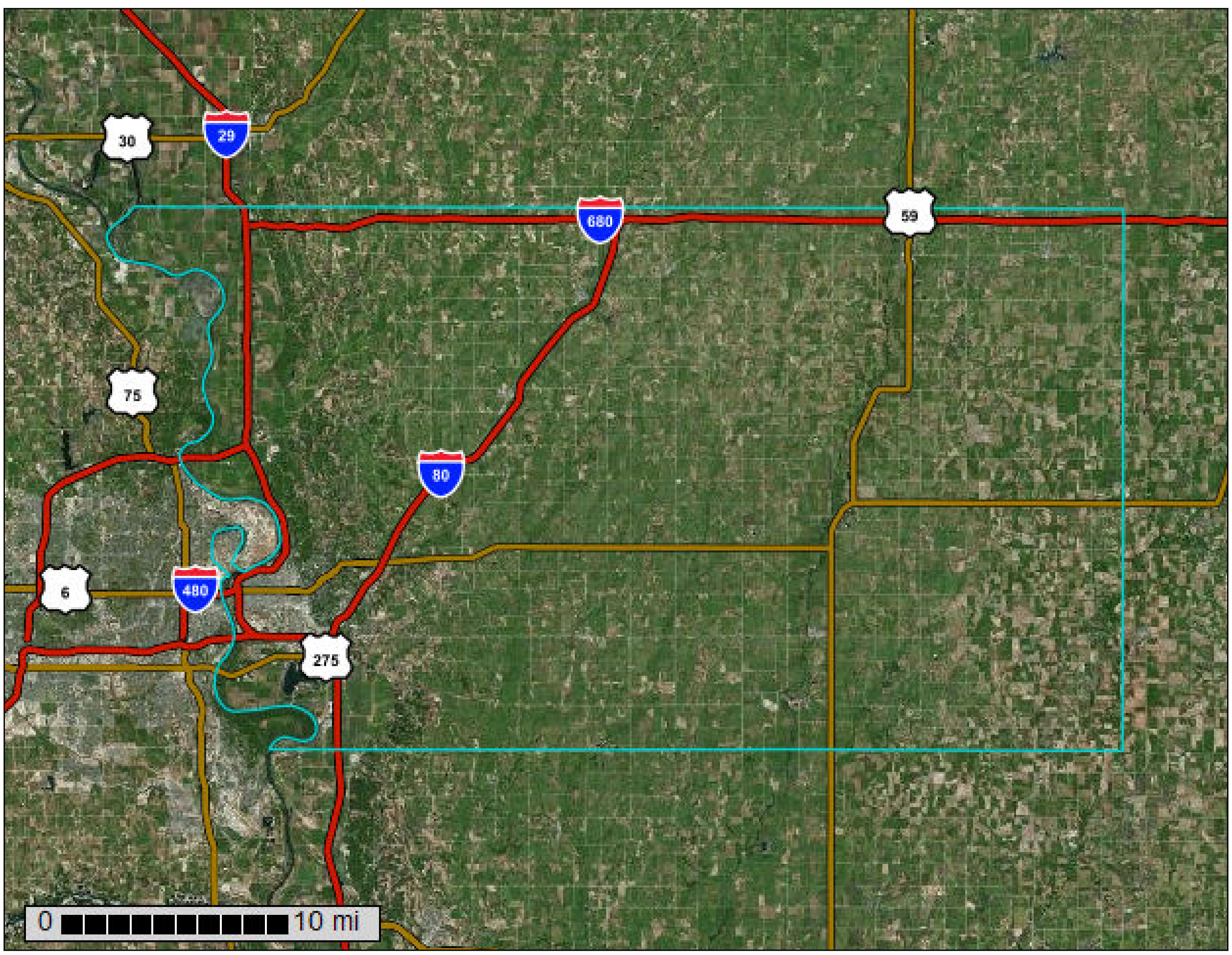
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Pottawattamie County, Iowa



September 2, 2025

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

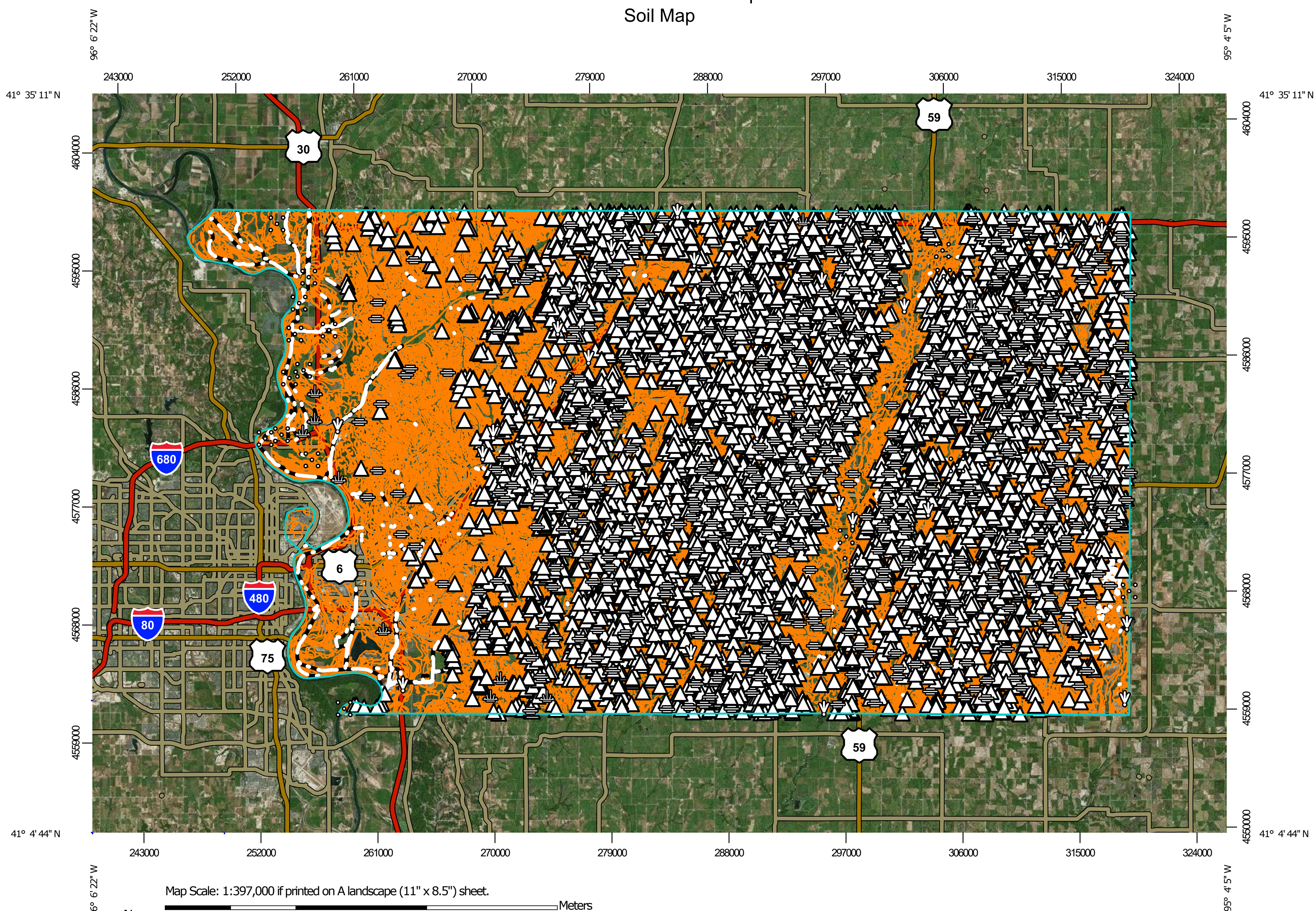
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:397,000 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 5000, 10000, 20000, 30000

Feet: 0, 15000, 30000, 60000, 90000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Pottawattamie County, Iowa
Survey Area Data: Version 30, Aug 29, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1C	Ida silt loam, 5 to 9 percent slopes	209.4	0.0%
1C3	Ida silt loam, 5 to 9 percent slopes, severely eroded	3,132.4	0.5%
1D	Ida silt loam, 9 to 14 percent slopes	398.4	0.1%
1D3	Ida silt loam, 9 to 14 percent slopes, severely eroded	20,034.9	3.3%
1E	Ida silt loam, 14 to 20 percent slopes	1,644.8	0.3%
1E3	Ida silt loam, 14 to 20 percent slopes, severely eroded	40,957.1	6.7%
1F	Ida silt loam, 20 to 30 percent slopes	3,768.3	0.6%
1F3	Ida silt loam, 20 to 30 percent slopes, severely eroded	5,488.3	0.9%
1G	Ida silt loam, 30 to 40 percent slopes	1,293.5	0.2%
2G	Hamburg silt loam, 40 to 75 percent slopes	4,004.2	0.7%
3E	Castana silt loam, 9 to 20 percent slopes	566.2	0.1%
8B	Judson silty clay loam, deep loess, 2 to 5 percent slopes	29,233.4	4.8%
8C	Judson silty clay loam, deep loess, 5 to 9 percent slopes	5,134.6	0.8%
9	Marshall silty clay loam, 0 to 2 percent slopes	2,880.1	0.5%
9B	Marshall silty clay loam, 2 to 5 percent slopes	42,642.6	6.9%
9C	Marshall silty clay loam, 5 to 9 percent slopes	4,287.1	0.7%
9C2	Marshall silty clay loam, 5 to 9 percent slopes, eroded	15,881.5	2.6%
9D	Marshall silty clay loam, 9 to 14 percent slopes	695.7	0.1%
9D2	Marshall silty clay loam, 9 to 14 percent slopes, eroded	7,583.1	1.2%
10	Monona silt loam, 0 to 2 percent slopes	491.6	0.1%
10B	Monona silt loam, 2 to 5 percent slopes	13,164.7	2.1%
10C	Monona silt loam, 5 to 9 percent slopes	7,923.9	1.3%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10C2	Monona silt loam, 5 to 9 percent slopes, eroded	19,879.7	3.2%
10C3	Monona silt loam, 5 to 9 percent slopes, severely eroded	1,470.6	0.2%
10D	Monona silt loam, 9 to 14 percent slopes	1,294.3	0.2%
10D2	Monona silt loam, 9 to 14 percent slopes, eroded	40,192.3	6.5%
10D3	Monona silt loam, 9 to 14 percent slopes, severely eroded	5,410.5	0.9%
10E	Monona silt loam, 14 to 20 percent slopes	943.6	0.2%
10E2	Monona silt loam, 14 to 20 percent slopes, eroded	3,113.6	0.5%
10E3	Monona silt loam, 14 to 20 percent slopes, severely eroded	2,585.5	0.4%
10F	Monona silt loam, 20 to 30 percent slopes	862.5	0.1%
10G	Monona silt loam, 30 to 40 percent slopes	793.1	0.1%
11B	Ackmore-Colo-Judson complex, 0 to 5 percent slopes	53,127.4	8.7%
12B	Napier silt loam, 2 to 5 percent slopes	43,358.2	7.1%
12C	Napier silt loam, 5 to 9 percent slopes	13,542.0	2.2%
12D	Napier silt loam, 9 to 14 percent slopes	1,311.0	0.2%
22C3	Dow silt loam, 5 to 9 percent slopes, severely eroded	246.9	0.0%
22D3	Dow silt loam, 9 to 14 percent slopes, severely eroded	1,070.2	0.2%
22E3	Dow silt loam, 14 to 20 percent slopes, severely eroded	275.9	0.0%
33D2	Steinauer clay loam, 9 to 14 percent slopes, moderately eroded	808.5	0.1%
33E2	Steinauer clay loam, 14 to 18 percent slopes, moderately eroded	740.2	0.1%
36	Salix silty clay loam, 0 to 2 percent slopes	1,200.6	0.2%
43	Bremer silty clay loam, 0 to 2 percent slopes, rarely flooded	2,222.5	0.4%
44	Blencoe silty clay, 0 to 2 percent slopes	526.0	0.1%
46	Keg silt loam, 0 to 2 percent slopes	1,158.4	0.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
54	Zook silty clay loam, 0 to 2 percent slopes, occasionally flooded	7,092.4	1.2%
54+	Zook silt loam, 0 to 2 percent slopes, occasionally flooded, overwash	2,962.5	0.5%
60D2	Malvern silty clay loam, 9 to 14 percent slopes, moderately eroded	919.9	0.1%
66	Luton silty clay, 0 to 2 percent slopes	4,210.3	0.7%
66+	Luton silt loam, overwash, 0 to 2 percent slopes	870.0	0.1%
70	McPaul silt loam, 0 to 2 percent slopes	9,705.2	1.6%
76C	Ladoga silt loam, dissected till plain, 5 to 9 percent slopes	405.1	0.1%
76D	Ladoga silt loam, 9 to 14 percent slopes	250.5	0.0%
76F	Ladoga silt loam, 14 to 25 percent slopes	806.5	0.1%
88	Nevin silty clay loam, 0 to 2 percent slopes, rarely flooded	1,196.8	0.2%
99C2	Exira silty clay loam, 5 to 9 percent slopes, eroded	5,754.7	0.9%
99D2	Exira silty clay loam, 9 to 14 percent slopes, eroded	53,934.4	8.8%
99D3	Exira silty clay loam, 9 to 14 percent slopes, severely eroded	3,289.7	0.5%
99E2	Exira silty clay loam, 14 to 20 percent slopes, eroded	1,457.0	0.2%
99E3	Exira silty clay loam, 14 to 20 percent slopes, severely eroded	1,075.9	0.2%
133	Colo silty clay loam, deep loess, 0 to 2 percent slopes, occasionally flooded	3,223.9	0.5%
133+	Colo silt loam, deep loess, 0 to 2 percent slopes, overwash, occasionally flooded	4,687.1	0.8%
137	Haynie silt loam, 0 to 2 percent slopes, occasionally flooded	7,957.9	1.3%
144	Blake silty clay loam, 0 to 2 percent slopes	2,427.7	0.4%
146	Onawa silty clay, 0 to 2 percent slopes	3,788.9	0.6%
149	Modale silt loam, 0 to 2 percent slopes	1,722.0	0.3%
156	Albaton silty clay, 0 to 2 percent slopes, occasionally flooded	8,132.9	1.3%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
156+	Albaton silt loam, 0 to 2 percent slopes, overwash, occasionally flooded	674.6	0.1%
179F	Gara loam, 10 to 24 percent slopes	1,338.8	0.2%
212	Kennebec silt loam, 0 to 2 percent slopes, occasionally flooded	4,286.8	0.7%
212+	Kennebec silt loam, 0 to 2 percent slopes, occasionally flooded, overwash	2,913.2	0.5%
222D2	Clarinda silty clay loam, deep loess, 9 to 14 percent slopes, eroded	734.8	0.1%
234	Nishna silty clay loam, 0 to 2 percent slopes	864.2	0.1%
237	Sarpy loamy fine sand, 0 to 3 percent slopes	3,946.0	0.6%
255	Cooper silty clay loam, 0 to 2 percent slopes	2,955.3	0.5%
275	Moville silt loam, 0 to 2 percent slopes	482.1	0.1%
430	Ackmore silt loam, 0 to 2 percent slopes, occasionally flooded	9,785.0	1.6%
436	Lakeport silty clay loam, 0 to 2 percent slopes	990.6	0.2%
509	Marshall silty clay loam, terrace, 0 to 2 percent slopes	1,856.0	0.3%
509B	Marshall silty clay loam, terrace, 2 to 5 percent slopes	1,098.3	0.2%
509C2	Marshall silty clay loam, terrace, 5 to 9 percent slopes, eroded	738.8	0.1%
510	Monona silt loam, terrace, 0 to 2 percent slopes	283.4	0.0%
510B	Monona silt loam, terrace, 2 to 5 percent slopes	232.9	0.0%
510C2	Monona silt loam, terrace, 5 to 9 percent slopes, eroded	218.2	0.0%
514	Grable silt loam, 0 to 2 percent slopes	1,576.9	0.3%
515	Percival silty clay, 0 to 2 percent slopes	2,178.6	0.4%
670	Rawles silt loam, 0 to 2 percent slopes	813.6	0.1%
717C	Napier-Gullied land complex, 2 to 10 percent slopes	543.0	0.1%
1233	Corley silt loam, 0 to 2 percent slopes	185.2	0.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1299	Minden silty clay loam, 0 to 2 percent slopes	677.2	0.1%
4001C	Ida-Urban land complex, 2 to 9 percent slopes	429.8	0.1%
4001D	Ida-Urban land complex, 9 to 14 percent slopes	251.6	0.0%
4001E	Ida-Urban land complex, 14 to 20 percent slopes	512.3	0.1%
4012B	Napier-Urban land complex, 2 to 5 percent slopes	529.7	0.1%
4046	Keg-Urban land complex, 0 to 2 percent slopes	2,064.5	0.3%
4156	Albaton-Urban land complex, 0 to 2 percent slopes, rarely flooded	466.0	0.1%
4170C	Castana-Urban land complex, 5 to 9 percent slopes	871.7	0.1%
4237	Sarpy-Urban land complex, 1 to 3 percent slopes	1,062.4	0.2%
4255	Cooper-Urban land complex, 0 to 2 percent slopes	1,420.6	0.2%
5030	Pits, limestone quarries	651.3	0.1%
5040	Udorthents, loamy	591.5	0.1%
5053	Psammaquents, frequently flooded	544.3	0.1%
5080	Udorthents, sanitary landfill	265.9	0.0%
INT	Intermittent water	143.6	0.0%
SL	Sewage lagoon	79.8	0.0%
W	Water	4,904.5	0.8%
Z24D2	Shelby clay loam, deep loess, 9 to 14 percent slopes, eroded	2,718.4	0.4%
Z24E2	Shelby clay loam, deep loess, 14 to 18 percent slopes, eroded	1,148.1	0.2%
Z24E3	Shelby clay loam, deep loess, 14 to 18 percent slopes, severely eroded	262.0	0.0%
Z93D2	Shelby-Adair clay loams, deep loess, 9 to 14 percent slopes, eroded	5,834.6	1.0%
Z93D3	Shelby-Adair clay loams, deep loess, 9 to 14 percent slopes, severely eroded	802.5	0.1%
Z192C2	Adair clay loam, deep loess, 5 to 9 percent slopes, eroded	108.6	0.0%
Z192D2	Adair clay loam, deep loess, 9 to 14 percent slopes, eroded	1,188.8	0.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Z1820	Dockery-Quiver silt loams, deep loess, 0 to 2 percent slopes, occasionally flooded	14,258.9	2.3%
Totals for Area of Interest		**613,905.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Pottawattamie County, Iowa

1C—Ida silt loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2sqrc
Elevation: 1,020 to 1,540 feet
Mean annual precipitation: 31 to 35 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 145 to 165 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ida and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

Ap - 0 to 9 inches: silt loam
C - 9 to 79 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

Minor Components

Napier

Percent of map unit: 5 percent
Landform: Loess hills

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Monona

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

1C3—Ida silt loam, 5 to 9 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2sqrd
Elevation: 990 to 1,540 feet
Mean annual precipitation: 28 to 34 inches
Mean annual air temperature: 47 to 51 degrees F
Frost-free period: 145 to 165 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ida, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida, Severely Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

Ap - 0 to 4 inches: silt loam
C - 4 to 79 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

Minor Components

Monona, severely eroded

Percent of map unit: 10 percent
Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Monona, eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Napier

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

1D—Ida silt loam, 9 to 14 percent slopes

Map Unit Setting

National map unit symbol: 2sqrg
Elevation: 930 to 1,500 feet
Mean annual precipitation: 31 to 35 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ida and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

Ap - 0 to 9 inches: silt loam
C - 9 to 79 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

Minor Components

Napier

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Monona

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Burchard

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R106XY075NE - Loamy Upland, R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

1D3—Ida silt loam, 9 to 14 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2sqrj
Elevation: 920 to 1,520 feet
Mean annual precipitation: 28 to 35 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ida, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida, Severely Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

Ap - 0 to 4 inches: silt loam
C - 4 to 79 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

Minor Components

Napier

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Burchard, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

Monona, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

1E—Ida silt loam, 14 to 20 percent slopes

Map Unit Setting

National map unit symbol: 2sqqz
Elevation: 910 to 1,500 feet
Mean annual precipitation: 31 to 34 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ida and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

Ap - 0 to 9 inches: silt loam
C - 9 to 79 inches: silt loam

Properties and qualities

Slope: 14 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

Minor Components

Monona

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Napier

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

1E3—Ida silt loam, 14 to 20 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2sqr0
Elevation: 940 to 1,510 feet
Mean annual precipitation: 28 to 34 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ida, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida, Severely Eroded

Setting

Landform: Loess hills

Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

Ap - 0 to 4 inches: silt loam
C - 4 to 79 inches: silt loam

Properties and qualities

Slope: 14 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

Minor Components

Monona, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Napier

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Burchard, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

1F—Ida silt loam, 20 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2sqr6
Elevation: 910 to 1,460 feet
Mean annual precipitation: 31 to 34 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of local importance

Map Unit Composition

Ida and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

Ap - 0 to 9 inches: silt loam
C - 9 to 79 inches: silt loam

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: B
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

Minor Components

Monona

Percent of map unit: 10 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Steinauer

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

1F3—Ida silt loam, 20 to 30 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2sqr7
Elevation: 920 to 1,520 feet
Mean annual precipitation: 28 to 34 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of local importance

Map Unit Composition

Ida, severely eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida, Severely Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Calcareous loess

Typical profile

Ap - 0 to 4 inches: silt loam
C - 4 to 79 inches: silt loam

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

Minor Components

Monona, eroded

Percent of map unit: 10 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Burchard, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

1G—Ida silt loam, 30 to 40 percent slopes

Map Unit Setting

National map unit symbol: 2sqr9
Elevation: 910 to 1,470 feet
Mean annual precipitation: 28 to 34 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of local importance

Map Unit Composition

Ida and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

Ap - 0 to 9 inches: silt loam
C - 9 to 79 inches: silt loam

Properties and qualities

Slope: 30 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

Minor Components

Monona

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Steinauer

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

2G—Hamburg silt loam, 40 to 75 percent slopes

Map Unit Setting

National map unit symbol: 2y69l
Elevation: 920 to 1,480 feet
Mean annual precipitation: 28 to 33 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Hamburg and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hamburg

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

A - 0 to 4 inches: silt loam
AC - 4 to 14 inches: silt loam

C - 14 to 79 inches: silt loam

Properties and qualities

Slope: 40 to 75 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie
Hydric soil rating: No

Minor Components

Liston

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

3E—Castana silt loam, 9 to 20 percent slopes

Map Unit Setting

National map unit symbol: fs48
Elevation: 900 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Castana and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Castana

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty local alluvium and colluvium

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 60 inches: silt loam

Properties and qualities

Slope: 9 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

8B—Judson silty clay loam, deep loess, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2sy6y
Elevation: 810 to 1,530 feet
Mean annual precipitation: 27 to 39 inches
Mean annual air temperature: 47 to 54 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Judson and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Judson

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty colluvium

Typical profile

Ap - 0 to 9 inches: silty clay loam
A - 9 to 22 inches: silty clay loam
AB - 22 to 28 inches: silty clay loam
Bt - 28 to 35 inches: silty clay loam
BC - 35 to 52 inches: silty clay loam
C - 52 to 79 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Minor Components

Ackmore, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: No

Colo, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie

Hydric soil rating: Yes

8C—Judson silty clay loam, deep loess, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2sy71
Elevation: 990 to 1,530 feet
Mean annual precipitation: 31 to 36 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 145 to 165 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Judson and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Judson

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty colluvium

Typical profile

Ap - 0 to 9 inches: silty clay loam
A - 9 to 22 inches: silty clay loam
AB - 22 to 28 inches: silty clay loam
Bt - 28 to 35 inches: silty clay loam
BC - 35 to 52 inches: silty clay loam
C - 52 to 79 inches: silty clay loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Minor Components

Ackmore, rarely flooded

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: No

Colo, frequently flooded

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB024IA - Wet Upland Drainageway Prairie
Hydric soil rating: Yes

Marshall

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

9—Marshall silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2sqpg
Elevation: 920 to 1,540 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Marshall and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marshall

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
A - 7 to 22 inches: silty clay loam
BA - 22 to 27 inches: silty clay loam
Bw1 - 27 to 59 inches: silty clay loam
Bw2 - 59 to 71 inches: silty clay loam
C - 71 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Corley

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R107XB022IA - Wet Upland Depression Prairie
Hydric soil rating: Yes

Minden

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear

Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

9B—Marshall silty clay loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2sy4g
Elevation: 680 to 1,560 feet
Mean annual precipitation: 30 to 41 inches
Mean annual air temperature: 47 to 55 degrees F
Frost-free period: 118 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Marshall and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marshall

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
A - 7 to 22 inches: silty clay loam
BA - 22 to 27 inches: silty clay loam
Bw1 - 27 to 59 inches: silty clay loam
Bw2 - 59 to 71 inches: silty clay loam
C - 71 to 79 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

9C—Marshall silty clay loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2sy4j
Elevation: 920 to 1,540 feet
Mean annual precipitation: 31 to 36 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Marshall and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marshall

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
A - 7 to 22 inches: silty clay loam
BA - 22 to 27 inches: silty clay loam
Bw1 - 27 to 59 inches: silty clay loam
Bw2 - 59 to 71 inches: silty clay loam
C - 71 to 79 inches: silty clay loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Marshall, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Exira, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

9C2—Marshall silty clay loam, 5 to 9 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2sqpl
Elevation: 860 to 1,560 feet
Mean annual precipitation: 31 to 37 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Marshall, eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marshall, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bw1 - 7 to 59 inches: silty clay loam
Bw2 - 59 to 71 inches: silty clay loam
C - 71 to 79 inches: silty clay loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Exira, severely eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Marshall

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

9D—Marshall silty clay loam, 9 to 14 percent slopes

Map Unit Setting

National map unit symbol: 2sy4l
Elevation: 960 to 1,540 feet
Mean annual precipitation: 31 to 36 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Marshall and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marshall

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
A - 7 to 22 inches: silty clay loam
BA - 22 to 27 inches: silty clay loam
Bw1 - 27 to 59 inches: silty clay loam
Bw2 - 59 to 71 inches: silty clay loam
C - 71 to 79 inches: silty clay loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie

Hydric soil rating: No

Minor Components

Marshall, eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Exira, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

9D2—Marshall silty clay loam, 9 to 14 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2sqpn
Elevation: 860 to 1,550 feet
Mean annual precipitation: 31 to 37 inches
Mean annual air temperature: 48 to 53 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Marshall, eroded, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marshall, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silty clay loam

Bw1 - 7 to 59 inches: silty clay loam
Bw2 - 59 to 71 inches: silty clay loam
C - 71 to 79 inches: silty clay loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Exira, severely eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Marshall

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Judson

Percent of map unit: 5 percent
Landform: Drainageways, alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Shelby, eroded

Percent of map unit: 5 percent

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

10—Monona silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2sy4w
Elevation: 930 to 1,450 feet
Mean annual precipitation: 38 to 43 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Monona and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
A - 7 to 15 inches: silt loam
Bw - 15 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

10B—Monona silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2sy56
Elevation: 880 to 1,490 feet
Mean annual precipitation: 28 to 37 inches
Mean annual air temperature: 48 to 53 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Monona and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
A - 7 to 15 inches: silt loam
Bw - 15 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Monona, eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

10C—Monona silt loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2sy4x
Elevation: 910 to 1,450 feet
Mean annual precipitation: 31 to 35 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monona and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
A - 7 to 15 inches: silt loam
Bw - 15 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Ida

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

10C2—Monona silt loam, 5 to 9 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2sy5d
Elevation: 890 to 1,520 feet
Mean annual precipitation: 28 to 37 inches
Mean annual air temperature: 48 to 53 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monona, eroded, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona, Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Monona

Percent of map unit: 20 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Ida, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

10C3—Monona silt loam, 5 to 9 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2sy5h
Elevation: 920 to 1,440 feet
Mean annual precipitation: 31 to 34 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monona, severely eroded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona, Severely Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 5 inches: silt loam
Bw - 5 to 28 inches: silt loam
C - 28 to 79 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Ida, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

10D—Monona silt loam, 9 to 14 percent slopes

Map Unit Setting

National map unit symbol: 2sy4y
Elevation: 920 to 1,460 feet
Mean annual precipitation: 31 to 35 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monona and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
A - 7 to 15 inches: silt loam
Bw - 15 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Ida

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

10D2—Monona silt loam, 9 to 14 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2sy5g
Elevation: 890 to 1,520 feet
Mean annual precipitation: 28 to 37 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monona, eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona, Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Monona, severely eroded

Percent of map unit: 10 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Ida, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

Napier

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

10D3—Monona silt loam, 9 to 14 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2sy5j
Elevation: 920 to 1,480 feet
Mean annual precipitation: 29 to 34 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monona, severely eroded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona, Severely Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 5 inches: silt loam
Bw - 5 to 28 inches: silt loam
C - 28 to 79 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Ida, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

10E—Monona silt loam, 14 to 20 percent slopes

Map Unit Setting

National map unit symbol: 2sy4z
Elevation: 910 to 1,440 feet
Mean annual precipitation: 31 to 33 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monona and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
A - 7 to 15 inches: silt loam
Bw - 15 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 14 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Minor Components

Ida

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

10E2—Monona silt loam, 14 to 20 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2sy59
Elevation: 920 to 1,480 feet
Mean annual precipitation: 28 to 34 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monona, eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona, Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 14 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Minor Components

Monona, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Ida, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

Burchard, eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie

Hydric soil rating: No

Napier

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

10E3—Monona silt loam, 14 to 20 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2sy5k
Elevation: 920 to 1,510 feet
Mean annual precipitation: 30 to 34 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monona, severely eroded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona, Severely Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 5 inches: silt loam
Bw - 5 to 28 inches: silt loam
C - 28 to 79 inches: silt loam

Properties and qualities

Slope: 14 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Minor Components

Ida, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

10F—Monona silt loam, 20 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2sy50
Elevation: 1,000 to 1,440 feet
Mean annual precipitation: 30 to 33 inches
Mean annual air temperature: 47 to 51 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Farmland of local importance

Map Unit Composition

Monona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam

A - 7 to 15 inches: silt loam
Bw - 15 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 20 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Minor Components

Ida, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

Monona, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Napier

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

10G—Monona silt loam, 30 to 40 percent slopes

Map Unit Setting

National map unit symbol: 2sy51
Elevation: 920 to 1,430 feet
Mean annual precipitation: 31 to 32 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Farmland of local importance

Map Unit Composition

Monona and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
A - 7 to 15 inches: silt loam
Bw - 15 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 30 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna
Hydric soil rating: No

Minor Components

Ida, severely eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

Dow, eroded

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

Napier

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

11B—Ackmore-Colo-Judson complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2zsp6
Elevation: 1,050 to 1,350 feet
Mean annual precipitation: 33 to 35 inches
Mean annual air temperature: 49 to 50 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Ackmore, occasionally flooded, and similar soils: 40 percent
Colo, occasionally flooded, and similar soils: 25 percent
Judson and similar soils: 25 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ackmore, Occasionally Flooded

Setting

Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Fine-silty alluvium

Typical profile

Ap - 0 to 6 inches: silt loam
C - 6 to 25 inches: silt loam
Ab - 25 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: R107XB024IA - Wet Upland Drainageway Prairie
Hydric soil rating: No

Description of Judson

Setting

Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Silty colluvium

Typical profile

Ap - 0 to 9 inches: silty clay loam
A - 9 to 22 inches: silty clay loam
AB - 22 to 28 inches: silty clay loam
Bt - 28 to 35 inches: silty clay loam
BC - 35 to 52 inches: silty clay loam
C - 52 to 79 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Description of Colo, Occasionally Flooded

Setting

Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Fine-silty alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam
A - 8 to 34 inches: silty clay loam
Bg - 34 to 46 inches: silty clay loam
BCg - 46 to 52 inches: silty clay loam
Cg - 52 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: R107XB024IA - Wet Upland Drainageway Prairie
Hydric soil rating: Yes

Minor Components

Nodaway, occasionally flooded

Percent of map unit: 10 percent

Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

12B—Napier silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2sy76
Elevation: 830 to 1,470 feet
Mean annual precipitation: 28 to 37 inches
Mean annual air temperature: 48 to 53 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Napier and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Napier

Setting

Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Local silty colluvium

Typical profile

Ap - 0 to 8 inches: silt loam
A - 8 to 29 inches: silt loam
Bw - 29 to 48 inches: silt loam
C - 48 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 13.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Minor Components

Smithland, occasionally flooded

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R107XB024IA - Wet Upland Drainageway Prairie
Hydric soil rating: No

Rawles, occasionally flooded

Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R107XB024IA - Wet Upland Drainageway Prairie
Hydric soil rating: No

Monona

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

12C—Napier silt loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2sy78
Elevation: 910 to 1,470 feet
Mean annual precipitation: 28 to 35 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 145 to 180 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Napier and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Napier

Setting

Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Local silty colluvium

Typical profile

Ap - 0 to 8 inches: silt loam
A - 8 to 29 inches: silt loam
Bw - 29 to 48 inches: silt loam
C - 48 to 79 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 13.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Minor Components

Rawles, occasionally flooded

Percent of map unit: 3 percent
Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R107XB024IA - Wet Upland Drainageway Prairie
Hydric soil rating: No

Monona

Percent of map unit: 2 percent

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

12D—Napier silt loam, 9 to 14 percent slopes

Map Unit Setting

National map unit symbol: 2sy79
Elevation: 990 to 1,420 feet
Mean annual precipitation: 31 to 33 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Napier and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Napier

Setting

Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Local silty colluvium

Typical profile

Ap - 0 to 8 inches: silt loam
A - 8 to 29 inches: silt loam
Bw - 29 to 48 inches: silt loam
C - 48 to 79 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Very high (about 13.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Minor Components

Monona

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Ida

Percent of map unit: 5 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

22C3—Dow silt loam, 5 to 9 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: fs3t
Elevation: 700 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Dow, severely eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dow, Severely Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Loess

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 60 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

22D3—Dow silt loam, 9 to 14 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: fs3v
Elevation: 700 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Dow, severely eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dow, Severely Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Loess

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 60 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

22E3—Dow silt loam, 14 to 20 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: fs3w
Elevation: 700 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Dow, severely eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dow, Severely Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Loess

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 60 inches: silt loam

Properties and qualities

Slope: 14 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

33D2—Steinauer clay loam, 9 to 14 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: fs45
Elevation: 1,000 to 1,500 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Steinauer, moderately eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Steinauer, Moderately Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Subglacial till

Typical profile

H1 - 0 to 6 inches: clay loam
H2 - 6 to 11 inches: clay loam
H3 - 11 to 60 inches: clay loam

Properties and qualities

Slope: 9 to 14 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

33E2—Steinauer clay loam, 14 to 18 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: fs46
Elevation: 1,000 to 1,500 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Steinauer, moderately eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Steinauer, Moderately Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Subglacial till

Typical profile

H1 - 0 to 6 inches: clay loam
H2 - 6 to 11 inches: clay loam
H3 - 11 to 60 inches: clay loam

Properties and qualities

Slope: 14 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

36—Salix silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs47
Elevation: 900 to 1,100 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Salix, rarely flooded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salix, Rarely Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 7 inches: silty clay loam
A1,A2 - 7 to 15 inches: silty clay loam
Bw1,Bw2 - 15 to 25 inches: silty clay loam
Bw3,BC - 25 to 40 inches: silt loam
C - 40 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 12.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C
Ecological site: R107XB020MO - Loamy Terrace Savanna
Hydric soil rating: No

43—Bremer silty clay loam, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 2y69j
Elevation: 690 to 1,200 feet
Mean annual precipitation: 34 to 37 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 145 to 170 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Bremer, rarely flooded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bremer, Rarely Flooded

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam
A - 8 to 19 inches: silty clay loam
Btg - 19 to 42 inches: silty clay loam
BCg - 42 to 50 inches: silty clay loam
Cg - 50 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)

Depth to water table: About 0 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

Minor Components

Zook, occasionally flooded
Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

Nevin, rarely flooded
Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: No

Wiota, rarely flooded
Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB020MO - Loamy Terrace Savanna
Hydric soil rating: No

44—Blencoe silty clay, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: fs4p
Elevation: 800 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days

Farmland classification: Prime farmland if drained

Map Unit Composition

Blencoe, rarely flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blencoe, Rarely Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium over silty alluvium

Typical profile

H1 - 0 to 22 inches: silty clay
H2 - 22 to 26 inches: silty clay
H3 - 26 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

Minor Components

Luton, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

Salix, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains

Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB020MO - Loamy Terrace Savanna
Hydric soil rating: No

46—Keg silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs4q
Elevation: 900 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Keg, rarely flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Keg, Rarely Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 35 inches: silt loam
H2 - 35 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: R107XB020MO - Loamy Terrace Savanna
Hydric soil rating: No

Minor Components

Luton, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

54—Zook silty clay loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2wnyj
Elevation: 680 to 2,750 feet
Mean annual precipitation: 26 to 37 inches
Mean annual air temperature: 46 to 53 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Zook, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zook, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 7 inches: silty clay loam
A1 - 7 to 20 inches: silty clay loam
A2 - 20 to 38 inches: silty clay
Bg - 38 to 61 inches: silty clay loam
Cg - 61 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

Minor Components

Zook, overwash, occasionally flooded
Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

Colo, occasionally flooded
Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB024IA - Wet Upland Drainageway Prairie
Hydric soil rating: Yes

Wabash, occasionally flooded, ponded
Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

54+—Zook silt loam, 0 to 2 percent slopes, occasionally flooded, overwash

Map Unit Setting
National map unit symbol: 2wnyk

Elevation: 740 to 1,430 feet
Mean annual precipitation: 31 to 37 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Zook, overwash, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zook, Overwash, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
A1 - 7 to 13 inches: silt loam
A2 - 13 to 50 inches: silty clay
Bg - 50 to 58 inches: silty clay loam
Cg - 58 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

Minor Components

Ackmore, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: No

Nodaway, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Humeston, occasionally flooded, ponded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R108XD914MO - Wet Terrace Prairie
Hydric soil rating: Yes

60D2—Malvern silty clay loam, 9 to 14 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: fs55
Elevation: 1,000 to 1,300 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Malvern, moderately eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Malvern, Moderately Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Red paleosol and underlying loess

Typical profile

H1 - 0 to 7 inches: silty clay loam
H2 - 7 to 36 inches: silty clay loam
H3 - 36 to 60 inches: silty clay

Properties and qualities

Slope: 9 to 14 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

66—Luton silty clay, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs56
Elevation: 900 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Luton, occasionally flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Luton, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 24 inches: silty clay
H2 - 24 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

Minor Components

Lakeport, occasionally flooded
Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: No

66+—Luton silt loam, overwash, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: fs57
Elevation: 600 to 1,300 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Luton, overwash, occasionally flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Luton, Overwash, Occasionally Flooded

Setting
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Clayey alluvium

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 24 inches: silty clay
H3 - 24 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

Minor Components

Moville, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

70—McPaul silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs59
Elevation: 900 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Mcpaul, occasionally flooded, and similar soils: 95 percent

Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mcpaul, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 13.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B/D
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Minor Components

Luton, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

76C—Ladoga silt loam, dissected till plain, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2xbl7
Elevation: 810 to 1,400 feet
Mean annual precipitation: 35 to 36 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 145 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ladoga, dissected till plain, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ladoga, Dissected Till Plain

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 7 inches: silt loam
E - 7 to 14 inches: silt loam
Bt - 14 to 51 inches: silty clay loam
C - 51 to 60 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R108XD860IA - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Hedrick

Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R108XD860IA - Loess Upland Prairie
Hydric soil rating: No

Ladoga, severely eroded

Percent of map unit: 5 percent
Landform: Interfluves
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R108XD860IA - Loess Upland Prairie
Hydric soil rating: No

76D—Ladoga silt loam, 9 to 14 percent slopes

Map Unit Setting

National map unit symbol: 2xbl9
Elevation: 900 to 1,400 feet
Mean annual precipitation: 35 to 36 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 145 to 165 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ladoga and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ladoga

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 7 inches: silt loam
E - 7 to 14 inches: silt loam

Bt - 14 to 51 inches: silty clay loam
C - 51 to 60 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R108XD860IA - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Gara

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Hedrick

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R108XD860IA - Loess Upland Prairie
Hydric soil rating: No

Armstrong

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

76F—Ladoga silt loam, 14 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2xbl4
Elevation: 1,110 to 1,300 feet
Mean annual precipitation: 35 to 35 inches
Mean annual air temperature: 50 to 50 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Ladoga and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ladoga

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 7 inches: silt loam
E - 7 to 14 inches: silt loam
Bt - 14 to 51 inches: silty clay loam
C - 51 to 60 inches: silt loam

Properties and qualities

Slope: 14 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R108XD860IA - Loess Upland Prairie
Hydric soil rating: No

88—Nevin silty clay loam, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 2xbmm
Elevation: 680 to 1,390 feet
Mean annual precipitation: 33 to 37 inches
Mean annual air temperature: 49 to 53 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Nevin, rarely flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nevin, Rarely Flooded

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam
A - 8 to 30 inches: silty clay loam
Btg - 30 to 46 inches: silty clay loam
BCg - 46 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C/D
Ecological site: R108XD914MO - Wet Terrace Prairie
Hydric soil rating: No

Minor Components

Bremer, rarely flooded

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R108XD914MO - Wet Terrace Prairie
Hydric soil rating: Yes

Wiota, rarely flooded

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R108XD941IA - Loamy Terrace Savanna
Hydric soil rating: No

99C2—Exira silty clay loam, 5 to 9 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2xbmz
Elevation: 980 to 1,550 feet
Mean annual precipitation: 31 to 36 inches
Mean annual air temperature: 47 to 51 degrees F
Frost-free period: 145 to 165 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Exira, eroded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Exira, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 6 inches: silty clay loam
Bw - 6 to 33 inches: silty clay loam
BC - 33 to 37 inches: silt loam
C - 37 to 79 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Marshall, eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

99D2—Exira silty clay loam, 9 to 14 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2xbn0
Elevation: 870 to 1,560 feet
Mean annual precipitation: 31 to 36 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Exira, eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Exira, Eroded

Setting

Landform: Hillslopes

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 6 inches: silty clay loam
Bw - 6 to 33 inches: silty clay loam
BC - 33 to 37 inches: silt loam
C - 37 to 79 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Shelby, eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Exira, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Adair, eroded

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Judson

Percent of map unit: 2 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

99D3—Exira silty clay loam, 9 to 14 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2xbn1
Elevation: 990 to 1,550 feet
Mean annual precipitation: 31 to 36 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 145 to 165 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Exira, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Exira, Severely Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 5 inches: silty clay loam
Bw - 5 to 36 inches: silty clay loam
BC - 36 to 44 inches: silt loam
C - 44 to 79 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Shelby, severely eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Judson

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Adair, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

99E2—Exira silty clay loam, 14 to 20 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2xbmx

Elevation: 990 to 1,550 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Exira, eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Exira, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 6 inches: silty clay loam
Bw - 6 to 33 inches: silty clay loam
BC - 33 to 37 inches: silt loam
C - 37 to 79 inches: silt loam

Properties and qualities

Slope: 14 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Shelby, eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD833IA - Till Backslope Savanna
Hydric soil rating: No

Judson

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Exira, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

99E3—Exira silty clay loam, 14 to 20 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2xbmy
Elevation: 1,060 to 1,420 feet
Mean annual precipitation: 34 to 35 inches
Mean annual air temperature: 49 to 50 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Exira, severely eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Exira, Severely Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 5 inches: silty clay loam
Bw - 5 to 36 inches: silty clay loam
BC - 36 to 44 inches: silt loam
C - 44 to 79 inches: silt loam

Properties and qualities

Slope: 14 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Shelby, severely eroded

Percent of map unit: 15 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD833IA - Till Backslope Savanna
Hydric soil rating: No

Judson

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

133—Colo silty clay loam, deep loess, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2sy6n
Elevation: 680 to 1,570 feet
Mean annual precipitation: 26 to 38 inches
Mean annual air temperature: 45 to 53 degrees F
Frost-free period: 140 to 180 days

Farmland classification: Prime farmland if drained

Map Unit Composition

Colo, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Colo, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium

Typical profile

Ap - 0 to 8 inches: silty clay loam
A - 8 to 34 inches: silty clay loam
Bg - 34 to 46 inches: silty clay loam
BCg - 46 to 52 inches: silty clay loam
Cg - 52 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

Minor Components

Calco, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

Kennebec, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread

Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB025IA - Loamy Floodplain Prairie
Hydric soil rating: No

Zook, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

133+—Colo silt loam, deep loess, 0 to 2 percent slopes, overwash, occasionally flooded

Map Unit Setting

National map unit symbol: 2sy6l
Elevation: 690 to 1,460 feet
Mean annual precipitation: 31 to 37 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Colo, overwash, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Colo, Overwash, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
A1 - 8 to 14 inches: silt loam
A2 - 14 to 34 inches: silty clay loam
Bg - 34 to 46 inches: silty clay loam
BCg - 46 to 52 inches: silty clay loam
Cg - 52 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

Minor Components

Zook, occasionally flooded
Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie, R108XD904IA - Wet Floodplain Prairie
Hydric soil rating: Yes

Ackmore, occasionally flooded
Percent of map unit: 5 percent
Landform: Drainageways
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R108XD824IA - Wet Upland Drainageway Prairie
Hydric soil rating: No

Kennebec, occasionally flooded
Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB025IA - Loamy Floodplain Prairie
Hydric soil rating: No

137—Haynie silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting
National map unit symbol: 2xbkn
Elevation: 840 to 1,140 feet

Mean annual precipitation: 28 to 35 inches
Mean annual air temperature: 49 to 53 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Haynie, occasionally flooded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Haynie, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
C - 7 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 48 to 79 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Minor Components

Grable, occasionally flooded

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Lossing, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Albaton, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

144—Blake silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs34
Elevation: 800 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Blake, occasionally flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blake, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

Ap - 0 to 7 inches: silty clay loam
C1 - 7 to 24 inches: silty clay loam
C2 - 24 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C/D
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Minor Components

Albaton, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

146—Onawa silty clay, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs35
Elevation: 850 to 1,100 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Onawa, rarely flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Onawa, Rarely Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium over silty alluvium

Typical profile

H1 - 0 to 8 inches: silty clay
H2 - 8 to 26 inches: silty clay
H3 - 26 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: No

Minor Components

Albaton, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

149—Modale silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs36
Elevation: 850 to 1,150 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Modale, occasionally flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Modale, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium over clayey alluvium

Typical profile

H1 - 0 to 24 inches: silt loam
H2 - 24 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: D
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Minor Components

Albaton, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

156—Albaton silty clay, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2xbkt
Elevation: 770 to 1,210 feet
Mean annual precipitation: 27 to 37 inches
Mean annual air temperature: 49 to 54 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Albaton, occasionally flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Albaton, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous clayey alluvium

Typical profile

Ap - 0 to 7 inches: silty clay
Cg - 7 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None

Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

Minor Components

Onawa, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: No

Blake, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

156+—Albaton silt loam, 0 to 2 percent slopes, overwash, occasionally flooded

Map Unit Setting

National map unit symbol: 2xbks
Elevation: 960 to 1,010 feet
Mean annual precipitation: 32 to 32 inches
Mean annual air temperature: 51 to 51 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Albaton, overwash, occasionally flooded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Albaton, Overwash, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous clayey alluvium

Typical profile

Ap - 0 to 12 inches: silt loam
Cg - 12 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

179F—Gara loam, 10 to 24 percent slopes

Map Unit Setting

National map unit symbol: fs39
Elevation: 650 to 1,350 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Gara and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gara

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Subglacial till

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 46 inches: clay loam
H3 - 46 to 60 inches: clay loam

Properties and qualities

Slope: 10 to 24 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R108XD833IA - Till Backslope Savanna
Hydric soil rating: No

Minor Components

Armstrong

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

212—Kennebec silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2wxs6
Elevation: 730 to 1,410 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kennebec, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kennebec, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
A - 8 to 54 inches: silt loam
C - 54 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: R107XB025IA - Loamy Floodplain Prairie
Hydric soil rating: No

Minor Components

Nodaway, occasionally flooded

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Colo, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

212+—Kennebec silt loam, 0 to 2 percent slopes, occasionally flooded, overwash

Map Unit Setting

National map unit symbol: 2xbm9
Elevation: 900 to 1,390 feet
Mean annual precipitation: 28 to 36 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kennebec, overwash, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kennebec, Overwash, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
A - 8 to 54 inches: silt loam
C - 54 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: R107XB025IA - Loamy Floodplain Prairie
Hydric soil rating: No

Minor Components

Colo, overwash, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

Rawles, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB024IA - Wet Upland Drainageway Prairie
Hydric soil rating: No

Nodaway, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

222D2—Clarinda silty clay loam, deep loess, 9 to 14 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2y6bq
Elevation: 1,110 to 1,500 feet
Mean annual precipitation: 34 to 36 inches
Mean annual air temperature: 49 to 50 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Clarinda, deep loess, eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clarinda, Deep Loess, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Clayey loess over gray paleosol developed in subglacial till

Typical profile

Ap - 0 to 6 inches: silty clay loam
2Btg - 6 to 67 inches: silty clay
2BC - 67 to 79 inches: silty clay

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R108XD864IA - Wet Upland Prairie
Hydric soil rating: Yes

Minor Components

Shelby, severely eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Exira, eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

234—Nishna silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs3x
Elevation: 950 to 1,100 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Nishna, occasionally flooded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nishna, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 19 inches: silty clay loam
H2 - 19 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

237—Sarpy loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: fs3y
Elevation: 700 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sarpy, occasionally flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sarpy, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy alluvium

Typical profile

H1 - 0 to 6 inches: loamy fine sand
H2 - 6 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F107XB015MO - Sandy/Loamy Floodplain Forest
Hydric soil rating: No

Minor Components

Albaton, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

Grable, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

255—Cooper silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs42
Elevation: 900 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Cooper, rarely flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cooper, Rarely Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium over clayey alluvium

Typical profile

H1 - 0 to 16 inches: silty clay loam
H2 - 16 to 24 inches: silty clay loam
H3 - 24 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: No

Minor Components

Luton, rarely flooded, ponded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

Keg, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB020MO - Loamy Terrace Savanna
Hydric soil rating: No

275—Moville silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs43
Elevation: 600 to 1,300 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Moville, occasionally flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Moville, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium over clayey alluvium

Typical profile

H1 - 0 to 26 inches: silt loam
H2 - 26 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D

Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Minor Components

Luton, occasionally flooded, ponded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

430—Ackmore silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2wxsb
Elevation: 740 to 1,540 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 51 degrees F
Frost-free period: 145 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Ackmore, occasionally flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ackmore, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium

Typical profile

Ap - 0 to 6 inches: silt loam
C - 6 to 25 inches: silt loam
Ab - 25 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 12 to 42 inches

Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: No

Minor Components

Nodaway, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Zook, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

436—Lakeport silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs4n
Elevation: 900 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Lakeport, rarely flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lakeport, Rarely Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 10 inches: silty clay loam
H2 - 10 to 20 inches: silty clay loam
H3 - 20 to 48 inches: silty clay loam
H4 - 48 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: High (about 11.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C/D
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: No

Minor Components

Luton, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

509—Marshall silty clay loam, terrace, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2sqph
Elevation: 920 to 1,380 feet
Mean annual precipitation: 31 to 36 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Marshall, terrace, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marshall, Terrace

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
A - 7 to 22 inches: silty clay loam
BA - 22 to 27 inches: silty clay loam
Bw1 - 27 to 59 inches: silty clay loam
Bw2 - 59 to 71 inches: silty clay loam
C - 71 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Judson

Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Minden, terrace

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

509B—Marshall silty clay loam, terrace, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2sqpk
Elevation: 920 to 1,470 feet
Mean annual precipitation: 31 to 36 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Marshall, terrace, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marshall, Terrace

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
A - 7 to 22 inches: silty clay loam
BA - 22 to 27 inches: silty clay loam
Bw1 - 27 to 59 inches: silty clay loam
Bw2 - 59 to 71 inches: silty clay loam

C - 71 to 79 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Judson

Percent of map unit: 5 percent
Landform: Alluvial fans
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Colo, frequently flooded

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R107XB024IA - Wet Upland Drainageway Prairie
Hydric soil rating: Yes

509C2—Marshall silty clay loam, terrace, 5 to 9 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2sqpm
Elevation: 960 to 1,420 feet
Mean annual precipitation: 31 to 36 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 165 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Marshall, eroded, terrace, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marshall, Eroded, Terrace

Setting

Landform: Stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silty clay loam
Bw1 - 7 to 59 inches: silty clay loam
Bw2 - 59 to 71 inches: silty clay loam
C - 71 to 79 inches: silty clay loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Marshall, terrace

Percent of map unit: 15 percent
Landform: Stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Judson

Percent of map unit: 10 percent
Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave

Across-slope shape: Linear
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

510—Monona silt loam, terrace, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2sy5r
Elevation: 1,020 to 1,280 feet
Mean annual precipitation: 29 to 33 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 145 to 165 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Monona, terrace, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona, Terrace

Setting

Landform: Stream terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
A - 7 to 15 inches: silt loam
Bw - 15 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): 1

Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Corley, terrace

Percent of map unit: 10 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R107XB022IA - Wet Upland Depression Prairie
Hydric soil rating: Yes

510B—Monona silt loam, terrace, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2sy5s
Elevation: 980 to 1,360 feet
Mean annual precipitation: 28 to 33 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 145 to 165 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Monona, terrace, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona, Terrace

Setting

Landform: Stream terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
A - 7 to 15 inches: silt loam
Bw - 15 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Monona, terrace, eroded

Percent of map unit: 15 percent
Landform: Stream terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

510C2—Monona silt loam, terrace, 5 to 9 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2sy63
Elevation: 1,000 to 1,360 feet
Mean annual precipitation: 29 to 33 inches
Mean annual air temperature: 50 to 50 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Monona, terrace, eroded, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Monona, Terrace, Eroded

Setting

Landform: Stream terraces
Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Fine-silty loess

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 30 inches: silt loam
C - 30 to 79 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 12 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Minor Components

Monona, terrace

Percent of map unit: 15 percent
Landform: Stream terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

Napier, terrace

Percent of map unit: 10 percent
Landform: Stream terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

514—Grable silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs51
Elevation: 700 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Grable, occasionally flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grable, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium over sandy alluvium

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 22 inches: silt loam
H3 - 22 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Minor Components

Albaton, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

Sarpy, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F107XB015MO - Sandy/Loamy Floodplain Forest
Hydric soil rating: No

515—Percival silty clay, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs52
Elevation: 700 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Percival, occasionally flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Percival, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium over sandy alluvium

Typical profile

H1 - 0 to 8 inches: silty clay
H2 - 8 to 24 inches: silty clay

H3 - 24 to 60 inches: stratified fine sand to loamy fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: No

Minor Components

Albaton, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

670—Rawles silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs58
Elevation: 650 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Rawles, occasionally flooded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rawles, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 23 inches: silt loam
H2 - 23 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 24 to 48 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 12.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: R107XB024IA - Wet Upland Drainageway Prairie
Hydric soil rating: No

Minor Components

Luton, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

717C—Napier-Gullied land complex, 2 to 10 percent slopes

Map Unit Setting

National map unit symbol: 2sy7c

Elevation: 920 to 1,450 feet
Mean annual precipitation: 28 to 34 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Napier and similar soils: 60 percent
Gullied land: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Napier

Setting
Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Local silty colluvium

Typical profile
Ap - 0 to 8 inches: silt loam
A - 8 to 29 inches: silt loam
Bw - 29 to 48 inches: silt loam
C - 48 to 79 inches: silt loam

Properties and qualities
Slope: 2 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 13.1 inches)

Interpretive groups
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Description of Gullied Land

Setting
Landform: Hillslopes

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydric soil rating: No

1233—Corley silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs2w
Elevation: 800 to 1,500 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Corley, terrace, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Corley, Terrace

Setting

Landform: Stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loess

Typical profile

H1 - 0 to 33 inches: silt loam
H2 - 33 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: R107XB022IA - Wet Upland Depression Prairie
Hydric soil rating: Yes

Minor Components

Minden, terrace

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

1299—Minden silty clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs2x
Elevation: 800 to 1,500 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Minden, terrace, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Minden, Terrace

Setting

Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

H1 - 0 to 23 inches: silty clay loam
H2 - 23 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: None

Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: C/D
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Minor Components

Corley, terrace

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R107XB022IA - Wet Upland Depression Prairie
Hydric soil rating: Yes

4001C—Ida-Urban land complex, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2sqrq
Elevation: 1,060 to 1,370 feet
Mean annual precipitation: 32 to 32 inches
Mean annual air temperature: 51 to 51 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Ida and similar soils: 50 percent
Urban land: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

Ap - 0 to 9 inches: silt loam
C - 9 to 79 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

Minor Components

Monona

Percent of map unit: 10 percent
Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

4001D—Ida-Urban land complex, 9 to 14 percent slopes

Map Unit Setting

National map unit symbol: 2sqrs
Elevation: 990 to 1,410 feet
Mean annual precipitation: 24 to 32 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Ida and similar soils: 50 percent
Urban land: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

Ap - 0 to 9 inches: silt loam
C - 9 to 79 inches: silt loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

Minor Components

Monona

Percent of map unit: 10 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB002MO - Deep Loess Upland Prairie
Hydric soil rating: No

4001E—Ida-Urban land complex, 14 to 20 percent slopes

Map Unit Setting

National map unit symbol: 2sqrn

Elevation: 1,000 to 1,400 feet
Mean annual precipitation: 28 to 32 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Ida and similar soils: 50 percent
Urban land: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ida

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Calcareous loess

Typical profile

Ap - 0 to 9 inches: silt loam
C - 9 to 79 inches: silt loam

Properties and qualities

Slope: 14 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R107XB006MO - Calcareous Loess Exposed Backslope Prairie, R107XB013MO - Calcareous Loess Protected Backslope Savanna
Hydric soil rating: No

Minor Components

Monona

Percent of map unit: 10 percent
Landform: Loess hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R107XB003MO - Deep Loess Exposed Backslope Savanna

Hydric soil rating: No

4012B—Napier-Urban land complex, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2sy7g
Elevation: 980 to 1,260 feet
Mean annual precipitation: 28 to 32 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Napier and similar soils: 55 percent
Urban land: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Napier

Setting

Landform: Loess hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Local silty colluvium

Typical profile

Ap - 0 to 8 inches: silt loam
A - 8 to 29 inches: silt loam
Bw - 29 to 48 inches: silt loam
C - 48 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 13.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: R107XB008MO - Loamy Footslope Savanna

Hydric soil rating: No

4046—Keg-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs4f
Elevation: 900 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Keg, rarely flooded, and similar soils: 50 percent
Urban land: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Keg, Rarely Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 35 inches: silt loam
H2 - 35 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: R107XB020MO - Loamy Terrace Savanna
Hydric soil rating: No

Minor Components

Luton, rarely flooded

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

4156—Albaton-Urban land complex, 0 to 2 percent slopes, rarely flooded

Map Unit Setting

National map unit symbol: 2xbl1
Elevation: 970 to 1,020 feet
Mean annual precipitation: 32 to 32 inches
Mean annual air temperature: 51 to 51 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Albaton, rarely flooded, and similar soils: 50 percent
Urban land, rarely flooded: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Albaton, Rarely Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous clayey alluvium

Typical profile

Ap - 0 to 7 inches: silty clay
Cg - 7 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 0 to 12 inches

Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

Description of Urban Land, Rarely Flooded

Properties and qualities

Slope: 0 to 2 percent
Frequency of flooding: Rare

Minor Components

Haynie, rarely flooded

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

4170C—Castana-Urban land complex, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: fs4h
Elevation: 900 to 1,500 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Castana and similar soils: 50 percent
Urban land: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Castana

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Silty local alluvium and colluvium

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 60 inches: silt loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Minor Components

Ida

Percent of map unit: 10 percent
Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB012MO - Calcareous Loess Upland Prairie
Hydric soil rating: No

4237—Sarpy-Urban land complex, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: fs4j

Elevation: 700 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Sarpy, rarely flooded, and similar soils: 50 percent
Urban land: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sarpy, Rarely Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy alluvium

Typical profile

H1 - 0 to 8 inches: loamy fine sand
H2 - 8 to 60 inches: fine sand

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F107XB015MO - Sandy/Loamy Floodplain Forest
Hydric soil rating: No

Minor Components

Albaton, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

Grable, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

4255—Cooper-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: fs4k
Elevation: 900 to 1,200 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Cooper, rarely flooded, and similar soils: 50 percent
Urban land: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cooper, Rarely Flooded

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium over clayey alluvium

Typical profile

H1 - 0 to 16 inches: silty clay loam
H2 - 16 to 33 inches: silty clay loam
H3 - 33 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Rare

Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: No

Minor Components

Luton, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB021MO - Wet Terrace Savanna
Hydric soil rating: Yes

Keg, rarely flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB020MO - Loamy Terrace Savanna
Hydric soil rating: No

5030—Pits, limestone quarries

Map Unit Setting

National map unit symbol: 2zv8x
Elevation: 520 to 1,350 feet
Mean annual precipitation: 33 to 38 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 145 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, limestone quarry: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

5040—Udorthents, loamy

Map Unit Setting

National map unit symbol: fs4s
Elevation: 660 to 980 feet
Mean annual precipitation: 34 to 41 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 175 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, loamy and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Loamy

Setting

Parent material: Loamy manipulated materials

Properties and qualities

Depth to restrictive feature: More than 80 inches
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: F105XY013WI - Loamy-Silty Upland
Hydric soil rating: Unranked

5053—Psammaquents, frequently flooded

Map Unit Setting

National map unit symbol: fs4t
Elevation: 500 to 1,400 feet
Mean annual precipitation: 26 to 36 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Psammaquents, frequently flooded, ponded, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Psammaquents, Frequently Flooded, Ponded

Setting

Landform: Flood plains
Parent material: Sandy deposits

Typical profile

H1 - 0 to 9 inches: loamy sand
H2 - 9 to 60 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Occasional
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F107XB015MO - Sandy/Loamy Floodplain Forest
Hydric soil rating: Yes

Minor Components

Albaton, frequently flooded, ponded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F107XB017MO - Clayey Floodplain Forest
Hydric soil rating: Yes

5080—Udorthents, sanitary landfill

Map Unit Setting

National map unit symbol: rm4c
Elevation: 790 to 1,410 feet
Mean annual precipitation: 26 to 34 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 155 to 175 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy deposits

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: Unranked

INT—Intermittent water

Map Unit Setting

National map unit symbol: rm49
Mean annual precipitation: 23 to 35 inches
Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 165 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Intermittent water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

SL—Sewage lagoon

Map Unit Setting

National map unit symbol: rm4b
Elevation: 660 to 980 feet
Mean annual precipitation: 34 to 41 inches
Mean annual air temperature: 48 to 54 degrees F
Frost-free period: 175 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Sewage lagoon: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

W—Water

Map Unit Setting

National map unit symbol: fs5z
Mean annual precipitation: 33 to 38 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Z24D2—Shelby clay loam, deep loess, 9 to 14 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2sqs4
Elevation: 850 to 1,480 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 48 to 53 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Shelby, deep loess, eroded, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelby, Deep Loess, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy subglacial till

Typical profile

Ap - 0 to 7 inches: clay loam
Bt - 7 to 37 inches: clay loam
Btk - 37 to 45 inches: clay loam
C - 45 to 79 inches: clay loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Minor Components

Adair, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Olmitz

Percent of map unit: 5 percent
Landform: Drainageways, alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Exira, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Burchard, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

Z24E2—Shelby clay loam, deep loess, 14 to 18 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2sqrt
Elevation: 910 to 1,510 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Shelby, deep loess, eroded, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelby, Deep Loess, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy subglacial till

Typical profile

Ap - 0 to 7 inches: clay loam
Bt - 7 to 37 inches: clay loam
Btk - 37 to 45 inches: clay loam
C - 45 to 79 inches: clay loam

Properties and qualities

Slope: 14 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R108XD833IA - Till Backslope Savanna
Hydric soil rating: No

Minor Components

Adair, eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Exira, eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Burchard, severely eroded

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

Olmitz

Percent of map unit: 2 percent
Landform: Drainageways, alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Z24E3—Shelby clay loam, deep loess, 14 to 18 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2sqry
Elevation: 1,100 to 1,500 feet
Mean annual precipitation: 34 to 35 inches
Mean annual air temperature: 49 to 50 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Shelby, deep loess, severely eroded, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelby, Deep Loess, Severely Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy subglacial till

Typical profile

Ap - 0 to 2 inches: clay loam
Bt - 2 to 48 inches: clay loam
BCk - 48 to 62 inches: clay loam
C - 62 to 79 inches: clay loam

Properties and qualities

Slope: 14 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R108XD833IA - Till Backslope Savanna

Hydric soil rating: No

Minor Components

Olmitz

Percent of map unit: 5 percent
Landform: Drainageways, alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Adair, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Exira, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Liston, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

Clarinda, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R108XD864IA - Wet Upland Prairie
Hydric soil rating: Yes

Z93D2—Shelby-Adair clay loams, deep loess, 9 to 14 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2wxry
Elevation: 990 to 1,500 feet
Mean annual precipitation: 33 to 36 inches
Mean annual air temperature: 48 to 51 degrees F
Frost-free period: 145 to 165 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Shelby, deep loess, eroded, and similar soils: 55 percent
Adair, deep loess, eroded, and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelby, Deep Loess, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy subglacial till

Typical profile

Ap - 0 to 7 inches: clay loam
Bt - 7 to 37 inches: clay loam
Btk - 37 to 45 inches: clay loam
C - 45 to 79 inches: clay loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Description of Adair, Deep Loess, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Erosional sediments over red paleosol developed in subglacial till

Typical profile

Ap - 0 to 7 inches: clay loam
2Bt1 - 7 to 17 inches: clay
2Bt2 - 17 to 59 inches: clay loam
2Bk - 59 to 74 inches: clay loam
2C - 74 to 79 inches: clay loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 12 to 16 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Minor Components

Exira, severely eroded

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Burchard, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

Z93D3—Shelby-Adair clay loams, deep loess, 9 to 14 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2wxs0
Elevation: 1,030 to 1,490 feet
Mean annual precipitation: 34 to 35 inches
Mean annual air temperature: 49 to 50 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Shelby, deep loess, severely eroded, and similar soils: 50 percent
Adair, deep loess, severely eroded, and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shelby, Deep Loess, Severely Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-loamy subglacial till

Typical profile

Ap - 0 to 2 inches: clay loam
Bt - 2 to 48 inches: clay loam
BCk - 48 to 62 inches: clay loam
C - 62 to 79 inches: clay loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Description of Adair, Deep Loess, Severely Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Erosional sediments over red paleosol developed in subglacial till

Typical profile

Ap - 0 to 3 inches: clay loam
2Bt1 - 3 to 26 inches: clay
2Bt2 - 26 to 59 inches: clay loam
2BCk - 59 to 70 inches: clay loam
2C - 70 to 79 inches: clay loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 12 to 16 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Minor Components

Steinauer, severely eroded

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB027IA - Calcareous Till Upland Prairie
Hydric soil rating: No

Lamoni, severely eroded

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Z192C2—Adair clay loam, deep loess, 5 to 9 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2wxrr
Elevation: 970 to 1,500 feet
Mean annual precipitation: 34 to 35 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Adair, deep loess, eroded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Adair, Deep Loess, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Erosional sediments over red paleosol developed in subglacial till

Typical profile

Ap - 0 to 7 inches: clay loam
2Bt1 - 7 to 17 inches: clay
2Bt2 - 17 to 59 inches: clay loam
2Bk - 59 to 74 inches: clay loam
2C - 74 to 79 inches: clay loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 12 to 16 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Minor Components

Shelby, eroded
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Marshall, eroded
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Z192D2—Adair clay loam, deep loess, 9 to 14 percent slopes, eroded

Map Unit Setting
National map unit symbol: 2wxrw
Elevation: 940 to 1,490 feet
Mean annual precipitation: 33 to 36 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 145 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Adair, deep loess, eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Adair, Deep Loess, Eroded

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Erosional sediments over red paleosol developed in subglacial till

Typical profile

Ap - 0 to 7 inches: clay loam
2Bt1 - 7 to 17 inches: clay
2Bt2 - 17 to 59 inches: clay loam
2Bk - 59 to 74 inches: clay loam
2C - 74 to 79 inches: clay loam

Properties and qualities

Slope: 9 to 14 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.01 in/hr)
Depth to water table: About 12 to 16 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Minor Components

Shelby, eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R108XD863IA - Till Upland Prairie
Hydric soil rating: No

Exira, severely eroded

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Ecological site: R107XB007MO - Loess Upland Prairie
Hydric soil rating: No

Olmitz

Percent of map unit: 5 percent
Landform: Drainageways, alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: R107XB008MO - Loamy Footslope Savanna
Hydric soil rating: No

Z1820—Dockery-Quiver silt loams, deep loess, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2zv98
Elevation: 870 to 1,400 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 47 to 53 degrees F
Frost-free period: 145 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Dockery, occasionally flooded, and similar soils: 55 percent
Quiver, occasionally flooded, and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dockery, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
C - 7 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: Occasional

Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F107XB016MO - Loamy Floodplain Forest
Hydric soil rating: No

Description of Quiver, Occasionally Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

Ap - 0 to 8 inches: silt loam
Cg - 8 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 20 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

Minor Components

Colo, occasionally flooded

Percent of map unit: 15 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: Yes

Lawson, occasionally flooded

Percent of map unit: 5 percent

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB019MO - Wet Floodplain Prairie
Hydric soil rating: No

Kennebec, occasionally flooded

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R107XB025IA - Loamy Floodplain Prairie
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix D

Storm Water Inspection Form

APPENDIX D - INSPECTION AND MAINTENANCE REPORT

INSPECTOR NAME & SIGNATURE: ____ DATE: ____________________________

INSPECTOR'S QUALIFICATIONS:

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DAYS SINCE LAST RAINFALL: ____________ AMOUNT OF LAST RAINFALL: ______________

Area	**Any Discharges?**	**BMPs Used**	**Condition**	**Problems Noted**	**Required Action and Date**

Appendix E

Completed Inspection Reports