



March 11, 2022

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NORTHWEST IOWA | DES MOINES METRO | EASTERN IOWA | SIOUXLAND | SOUTHWEST IOWA | CENTRAL MISSOURI | KANSAS CITY METRO

Re: Redwood Independence
Preliminary Stormwater Management Study

To Whom it May Concern:

The proposed Redwood Development is a 44.7 acre multi-family residential development located at the southwest corner of Mize Road and Jackson Drive. The proposed development is shown on the preliminary site development plan that has been submitted to the City. The site is bisected by a ridge line. The north 22.0 acres drains north into an existing creek that crosses through the northeast corner of the site. The south 22.7 acres drains south into an existing creek that crosses through the southwest corner of the site.

In the proposed condition, the drainage patterns will generally remain the same and the site will drain to detention basins located in the north and south portions of the property. The detention basins will provide flood control protection up to the 100 year storm with a maximum release rate of 1.8 cfs/acre.

The detention basins will also serve as BMPs for stormwater treatment in the form of extended detention wetlands. Catch basin inserts and native vegetation will also be provided to meet the required level of service. The level of service calculations that show the existing condition and the proposed treatment approach are attached. The soils map showing hydrologic soil groups on the site is also attached.

The overall impervious area of the proposed development is 19.7 acres or 44% of the site. Based on this, we estimate that the required storage volume will be approximately 10,000 cubic feet per acre of land area for both water quality and flood control detention volume. The north detention basin will contain approximately 220,000 cubic feet of storage and the south detention basin will contain approximately 227,000 cubic feet of storage. Final detention calculations including routing calculations will be prepared with the final stormwater management study.

Please contact me if you have any questions.

Very truly yours,

MCCLURE ENGINEERING COMPANY

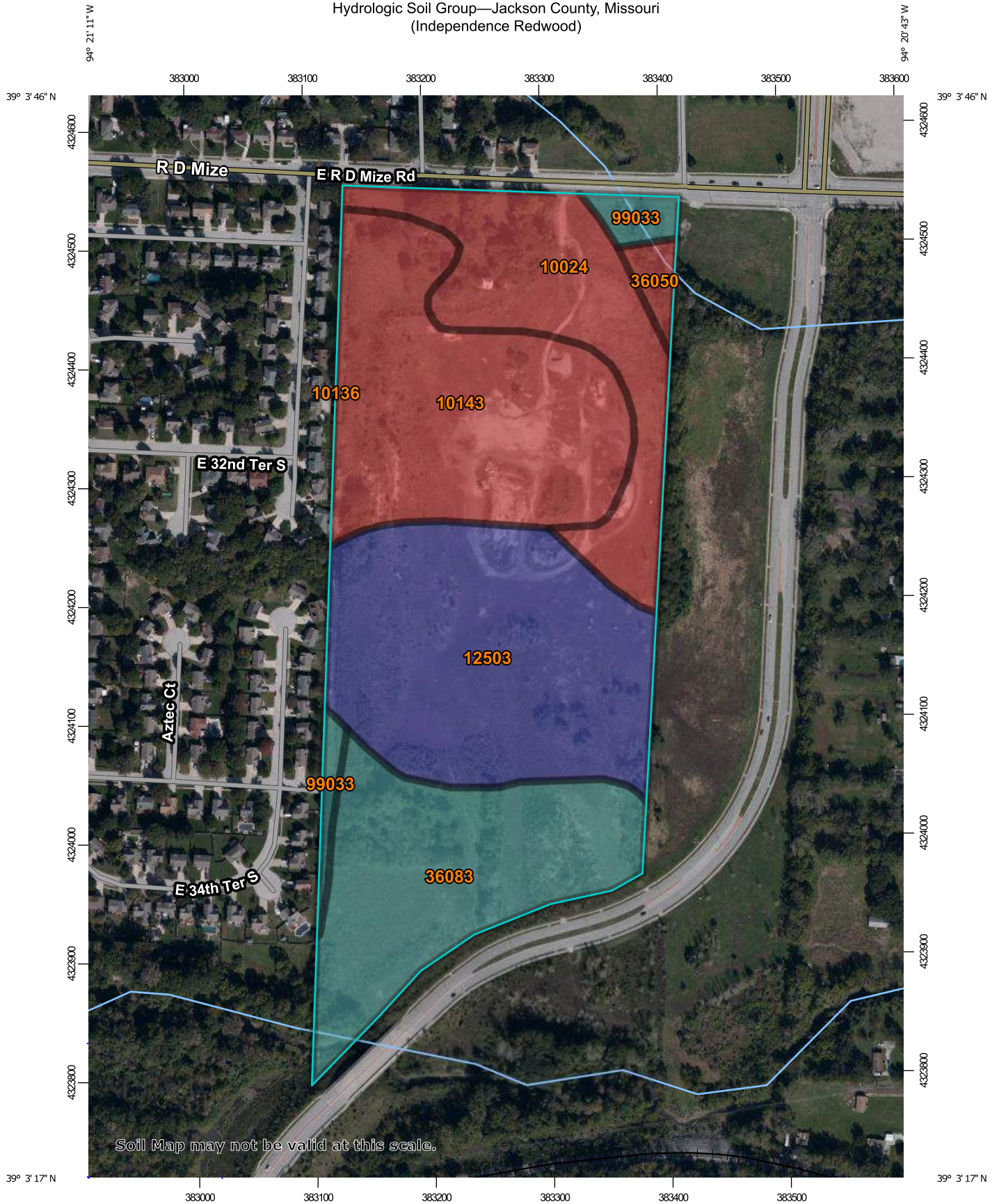
By: Patrick L. Kullberg, P.E., LEED® AP
Sr. Project Engineer



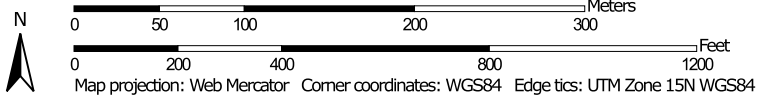
03/11/2022

PATRICK L. KULLBERG
PE-2004018129

Hydrologic Soil Group—Jackson County, Missouri
(Independence Redwood)




Map Scale: 1:4,440 if printed on A portrait (8.5" x 11") sheet.



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points




 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


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 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Jackson County, Missouri
 Survey Area Data: Version 23, Sep 1, 2021

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

Date(s) aerial images were photographed: Sep 6, 2019—Nov 16, 2019

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
10024	Greenton-Urban land complex, 5 to 9 percent slopes	D	7.6	17.2%
10136	Sibley-Urban land complex, 2 to 5 percent slopes	C	0.0	0.0%
10143	Snead-Urban land complex, 9 to 30 percent slopes	D	11.8	26.7%
12503	Napier silt loam, 0 to 3 percent slopes	B	13.4	30.2%
36050	Zook silty clay loam, 0 to 2 percent slopes, occasionally flooded	D	0.6	1.4%
36083	Kennebec silt loam, 1 to 4 percent slopes, occasionally flooded	C	9.7	21.9%
99033	Udarents-Urban land complex, 2 to 9 percent slopes	C	1.2	2.7%
Totals for Area of Interest			44.3	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

WORKSHEET 1: REQUIRED LEVEL OF SERVICE (UNDEVELOPED SITE)

Project: Redwood Independence by: PLK
 Location: Mize Road & Jackson Dr date: 3/11/2022
 Total Site Area (Ac.): 44.7

1. Runoff Curve Number

A. Pre-development CN

Cover Description	HSG	CN	Area (Ac.)	CNxArea
Grassland - fair	B	69	13.50	931.50
Grassland - fair	C	79	11.00	869.00
Grassland - fair	D	84	20.20	1696.80
				0.00
				0.00
				0.00
Totals:			44.70	3497.30

Area-Weighted CN = total product/total area = 78

B. Post-development CN

Cover Description	HSG	CN	Area (Ac.)	CNxArea
Impervious Area	D	98	19.70	1930.60
Open Space - Good	D	80	13.10	1048.00
Grassland - Fair	B/C/D	79	11.90	940.10
				0.00
				0.00
				0.00
				0.00
Totals:			44.70	3918.70

Area-Weighted CN = total product/total area = 88

2. Level of Service (LS) Calculation

Pre-development CN: 78

Post-development CN: 88

Difference: 10

LS Required 6.4

WORKSHEET 2: DEVELOP MITIGATION PACKAGE(S) THAT MEET THE REQUIRED LS

Project: Redwood Independence by: PLK Date: 3/11/2022
 Location: Mize Road & Jackson Drive checked: PLK Date:
 Site Area (Ac.): 44.7 Date:
 Sheet 1 of 1
 Previously Developed Yes
 No

1. Required LS (from Table 1 or 1A or Worksheet 1 or 1A, as appropriate) 6.4

2. Proposed BMP Option Package No. 1

BMP/Cover Description	Treatment Area	VR from Table 5 or Table 6 ¹	Product of VR x Area	Notes:
TT: Catch Basin Inserts into Extended Wet Detention	30.70	7.00	214.90	
Extended Wet Detention	11.00	5.0	55.00	
Native Vegetation	1.80	9.25	16.65	
Untreated	1.20	0.0	0.00	
Total	44.7	Total:	286.55	
		*Weighted VR:	6.41	

¹ VR calculated for final BMP only in Treatment Train.
² Total Treatment area cannot exceed 100 percent of the actual site area.
 * Blank In Redevelopment

Meets required LS (Yes/No)? Yes (If No, or if additional options are being tested, proceed below.)

3. Proposed BMP Option Package No. _____

BMP/Cover Description	Treatment Area	VR from Table 5 or Table 6 ¹	Product of VR x Area	Notes:
Total	0	Total:	0.00	
		*Weighted VR:	#DIV/0!	

¹ VR calculated for final BMP only in Treatment Train.
² Total Treatment area cannot exceed 100 percent of the actual site area.
 * Blank In Redevelopment

Meets required LS (Yes/No)? #DIV/0! (If No, or if additional options are being tested, proceed below.)