INNOVATIVE DESIGN. **CLASSIC RESULTS.**

DRAINAGE LETTER
FOR
FOREST LAKES PHASE 2
EL PASO COUNTY, COLORADO

OCTOBER 2019

Prepared for:
FOREST LAKES RESIDENTIAL DEVELOPMENT, LLC
6385 CORPORATE DRIVE SUITE 200
COLORADO SPRINGS CO 80919
(719) 592-9333

Job no. 1175.20
PCD File No. PUDSP-18-001

CLASSIC CONSULTING
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ClassicConsulting.net

DRAINAGE LETTER
FOREST LAKES PHASE 2, EL PASO COUNTY, COLORADO

DRAINAGE REPORT STATEMENT

ENGINEER'S STATEMENT:
The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

COLORADO LICENSED KYLE RAYE CAMPBELL 29794 PROFESSIONAL ENGINEER

Kyle R. Campbell, P.E. Colorado P.E. #29794

10.17.19
Date

OWNER/DEVELOPER'S STATEMENT:
I, the owner/developer, have read and will comply with all of the requirements specified in this drainage report and plan.

Business Name: Forest Lakes Residential Development, LLC

By:

Title: VICE PRESIDENT

Address: 6385 Corporate Drive, Suite 200

Colorado Springs, CO 80919

EL PASO COUNTY:

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

Jennifer Irvine, P.E.
County Engineer / ECM Administrator

Approved
by Elizabeth Nijkamp
El Paso County Planning and Community Development
on behalf of Jennifer Irvine, County Engineer, ECM Administrator
10/21/2019 5:24:48 PM

Conditions:

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PURPOSE

The purpose of this Drainage Letter is to support the Minor Amendment to the previously approved Development Plan and Preliminary Plan. This letter is submitted in conjunction with the Planning and Community Development submittal of the Amended Development Plan and Development Plan. The Minor Amendment is to obtain water sufficiency approval as well as to alter the site layout to reflect adjustments warranted by the detailed detention facility design.

GENERAL DESCRIPTION

The Forest Lakes development is a phased master planned community located in northern El Paso County, Colorado. The master planned land includes areas of open space, residential, trails, drainage, preservation and two water supply reservoirs. The property lies to the east of Pike National Forest, north of the United States Air Force Academy, west of Interstate 25 and south of the Town of Monument. The Forest Lakes property is located in portions of Sections 27, 28, 29 and 33 of Township 11 South, Range 67 West of the Sixth Principal Meridian and covers approximately 900 acres. The Phase 2 area is the far westerly area east of Filing 1 and is comprised of 287 acres. Watersheds that impact the Phase 2 property include Beaver Creek, Hell Creek and North Beaver Creek. These watersheds are tributary to Monument Creek. Monument Creek itself passes along the eastern boundary of the overall Forest Lakes property in a north to south direction. The purpose of this letter is to support the Minor Amendment of the Development Plan and Preliminary Plan to obtain a determination of water sufficiency and to make minor lot adjustments to the previously approved plan. The street layout and total number of lots is not proposed to be changed. The vicinity map for the Phase 2 Amendment area is presented in the Appendix of this report.

Soils within the watersheds that are tributary to the Forest Lakes property vary between soil types A through D, as identified by the U.S. Department of Agriculture, Soil Conservation Service. Soils are classified in hydrologic groups A, B, C, and D according to their infiltration capacity. Type D soils are dominant in the forested areas west of Monument Creek. These soils are generally associated with the Pikes Peak Granite found in the region. This is particularly true for the forested portion of the Beaver Creek watershed. The decomposed granite soils exhibit extremely high rates of runoff and are very susceptible to erosion and sedimentation. Hydrologic Soils Group A soils consist chiefly of well-drained sand and gravel and have a low runoff potential. The soils within the Forest Lakes property are predominantly soil type B. See Appendix for additional information.

EXISTING DRAINAGE CONDITIONS

The existing conditions for this community are examined in the "Forest Lakes Master Development Drainage Plan", by Kiowa Engineering Corporation and approved April 11, 2002 and the subsequent "Master Development Drainage Plan Amendment and Preliminary Drainage Report for Forest Lakes (Filing 5, 6 and 7)", by Classic Consulting Engineers and Surveyors, LLC, and approved April 1, 2019 (MDDP Amendment). The approved drainage design intent of the reports is still being adhered to.

PROPOSED DRAINAGE CONDITIONS

For the Minor Amendment, the proposed drainage conditions are also outlined in the MDDP Amendment. As no changes to the street layout or quantity of lots is proposed (just the lot layout is being modified), no changes to the overall drainage patterns or quantities from the approved MDDP Amendment are anticipated.

DRAINAGE CRITERIA

The hydrology for the major sub-watersheds (i.e., Beaver Creek), were estimated using the methods outlined in the initial Master Development Drainage Plan. Exhibit A presents the major sub-watersheds that impact the Forest Lakes property. All updated calculations for the Phase 2 Amendment area were performed using the following:

Hydrologic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, as revised in November 1991 and October 1994. Stormwater quality analysis and Extended Detention Basin (EDB) design are per the Urban Drainage and Flood Control District Manual and UD-BMP Version 3.01 spreadsheet. The Rational Method was used to estimate stormwater runoff to the proposed inlets and storm sewer pipes and for comparison purposes to the runoff rates found within the previous reports. As no modifications to the approved drainage basins are proposed, no drainage calculations or maps are included in this letter.

FLOODPLAIN STATEMENT

A portion of this site is located within a floodplain as determined by the Flood Insurance Rate Maps (F.I.R.M.) Map Number 08041C 0270F effective date, March 17, 1997 (See Appendix). No proposed

development is anticipated to take place within the floodplain other than two proposed roadway crossings as reflected on the drainage maps. At the time of the Final Drainage Report submittal, FEMA coordination will be initiated for this section of North Beaver Creek if required.

DRAINAGE AND BRIDGE FEES

Forest Lakes Phase 2 is to be platted in the future and is within the Beaver Creek Miscellaneous Drainage Basin. The fees in place at the time of platting will be calculated within future Final Drainage Reports.

SUMMARY

The proposed Minor Amendment to the Approved Development Plan and Preliminary Plan remains consistent with the previously approved MDDP Amendment. All developed flows were previously accounted for along with all full spectrum detention and stormwater quality requirements. The proposed development will not adversely impact surrounding properties.

PREPARED BY:

Classic Consulting Engineers & Surveyors, LLC
Kyle R. Campbell, P.E.
Division Manager

Sm/117520/reports/Drainage Letter.doc

REFERENCES

1. City of Colorado Springs/County of El Paso Drainage Criteria Manual, as revised in November 1991 and 1994 with County adopted Chapter 6 and Section 3.2.1 of Chapter 13 of the City of Colorado Springs/El Paso County Drainage Criteria Manual as revised in May 2014.

2. "Forest Lakes Master Development Drainage Plan," by Kiowa Engineering Corporation, revised April 11, 2002.

3. "Master Development Drainage Plan Amendment and Preliminary Drainage Report for Forest Lakes (Filing 5, 6 and 7)," by Classic Consulting Engineers and Surveyors, LLC, approved April 1, 2019.

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APPENDIX

VICINITY MAP

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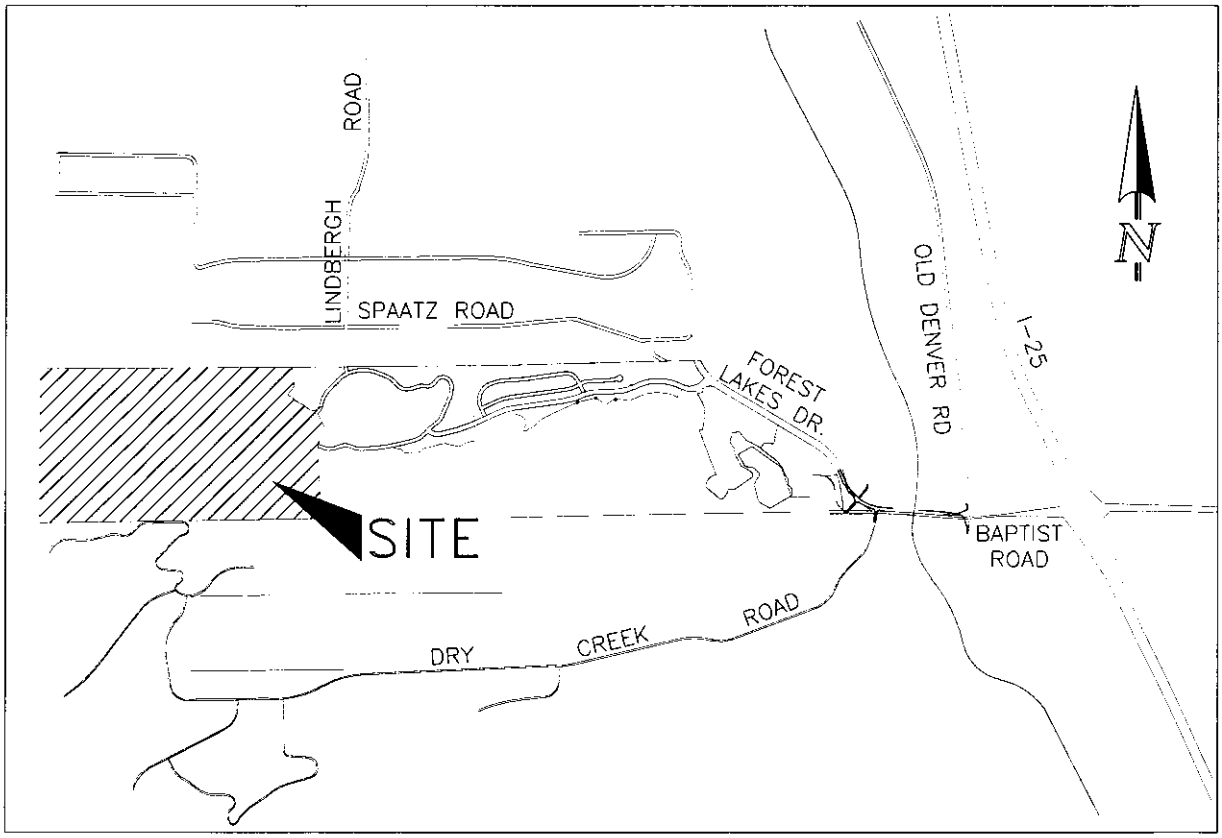

VICINITY MAP

NOT TO SCALE

SOILS MAP (WEB SOIL SURVEY)

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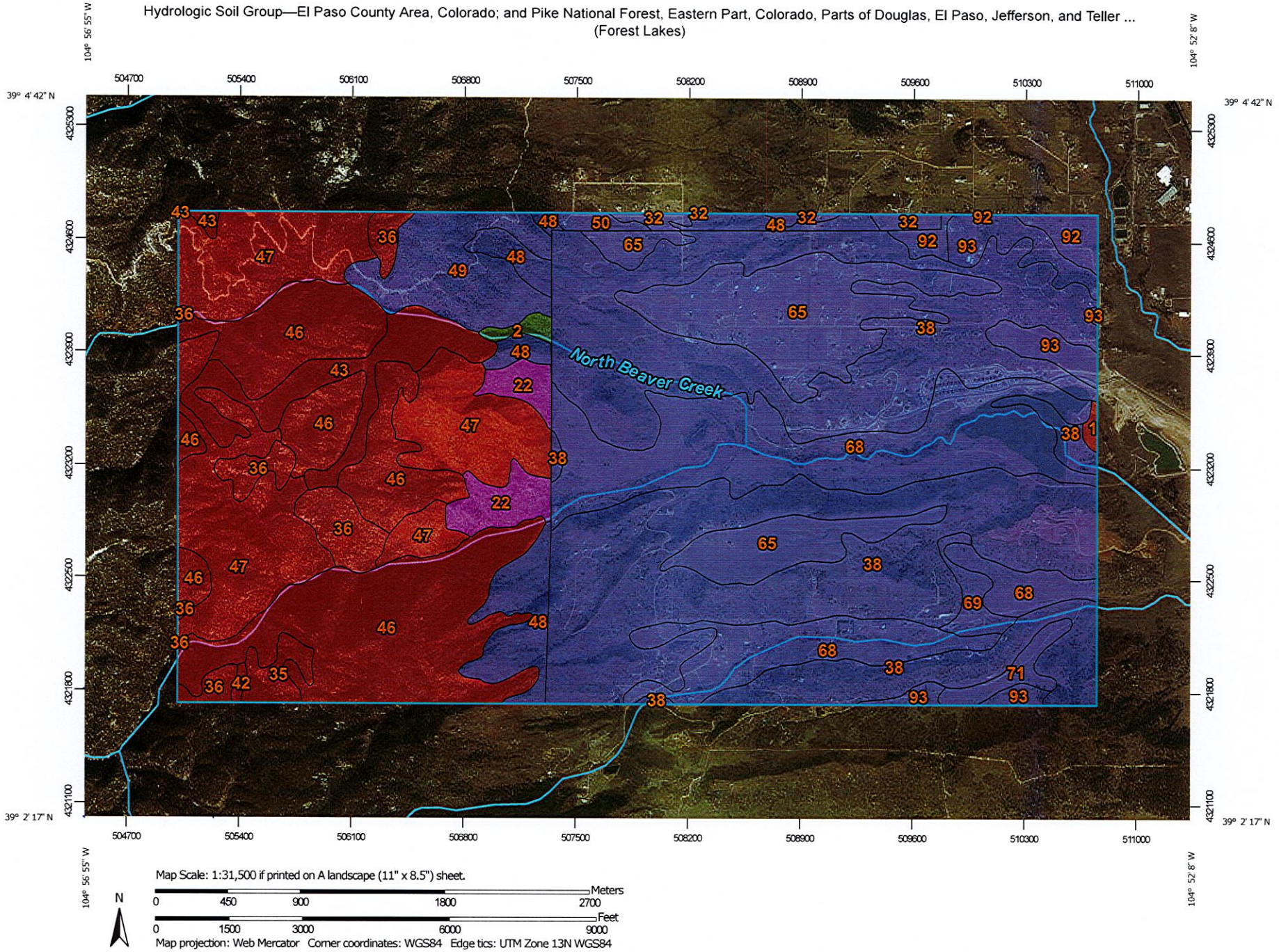
Hydrologic Soil Group—El Paso County Area, Colorado; and Pike National Forest, Eastern Part, Colorado, Parts of Douglas, El Paso, Jefferson, and Teller ...
(Forest Lakes)



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.

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: El Paso County Area, Colorado
Survey Area Data: Version 15, Oct 10, 2017

Soil Survey Area: Pike National Forest, Eastern Part, Colorado, Parts of Douglas, El Paso, Jefferson, and Teller Counties
Survey Area Data: Version 4, Oct 12, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Feb 22, 2014—Mar 9, 2017

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
1	Alamosa loam, 1 to 3 percent slopes	D	4.9	0.1%
38	Jarre-Tecolote complex, 8 to 65 percent slopes	B	1,396.0	32.2%
65	Perrypark gravelly sandy loam, 3 to 9 percent slopes	B	353.9	8.2%
68	Peyton-Pring complex, 3 to 8 percent slopes	B	565.0	13.0%
69	Peyton-Pring complex, 8 to 15 percent slopes	B	28.5	0.7%
71	Pring coarse sandy loam, 3 to 8 percent slopes	B	29.4	0.7%
92	Tomah-Crowfoot loamy sands, 3 to 8 percent slopes	B	39.9	0.9%
93	Tomah-Crowfoot complex, 8 to 15 percent slopes	B	100.4	2.3%
Subtotals for Soil Survey Area			**2,518.0**	**58.0%**
Totals for Area of Interest			**4,341.0**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2	Aquolls, 1 to 10 percent slopes	A/D	11.0	0.3%
22	Kassler very gravelly coarse sandy loam, 5 to 35 percent slopes	A	71.5	1.6%
32	Perrypark coarse sandy loam, 1 to 15 percent slopes	B	25.3	0.6%
35	Rock outcrop-Sphinx complex, 15 to 80 percent slopes	D	29.2	0.7%
36	Rock outcrop-Sphinx, warm complex, 15 to 80 percent slopes	D	100.6	2.3%
42	Sphinx gravelly coarse sandy loam, 15 to 40 percent slopes	D	3.8	0.1%
43	Sphinx gravelly coarse sandy loam, 40 to 70 percent slopes	D	126.1	2.9%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
46	Sphinx-Rock outcrop complex, 15 to 80 percent slopes	D	620.4	14.3%
47	Sphinx, warm-Rock outcrop complex, 15 to 80 percent slopes	D	526.7	12.1%
48	Tecolote very gravelly sandy loam, 15 to 40 percent slopes, very stony	B	147.4	3.4%
49	Tecolote very gravelly sandy loam, 40 to 70 percent slopes, very stony	B	148.3	3.4%
50	Tomah sandy loam, 2 to 15 percent slopes	B	12.5	0.3%
Subtotals for Soil Survey Area			**1,823.0**	**42.0%**
Totals for Area of Interest			**4,341.0**	**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

F.E.M.A. MAP

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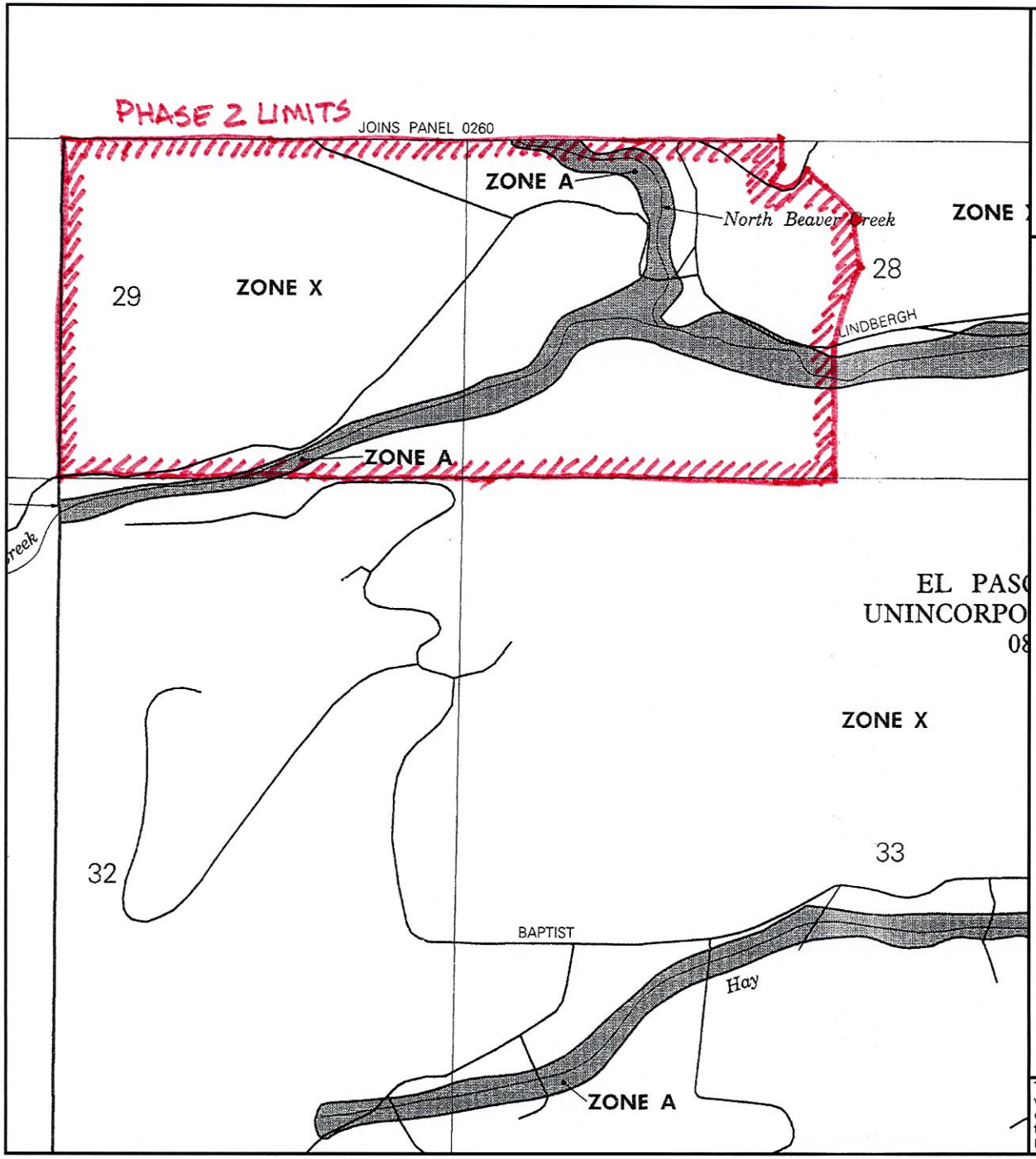

APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 270 OF 1300

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY, UNINCORPORATED AREAS	080059	0270	F

MAP NUMBER
08041C0270 F

EFFECTIVE DATE:
MARCH 17, 1997

Federal Emergency Management Agency