

**MASTER DEVELOPMENT DRAINAGE PLAN FOR  
LOT 1177 WOODMEN HILLS FILING #10  
EL PASO COUNTY, COLORADO**

**OCTOBER 2020**

Prepared For:

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TNE Job No. 2015.00  
County Job No. SKP-20-003

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LOT 1177 WOODMEN HILLS FILING #10  
EL PASO COUNTY, COLORADO**

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**MASTER DEVELOPMENT DRAINAGE PLAN FOR  
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**CERTIFICATION STATEMENT:**

Engineers Statement

This 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 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.

\_\_\_\_\_  
Dane Frank, P.E. 50207

\_\_\_\_\_  
Seal

Developers Statements

I, Phillip Buford and Mary Jean Berg Buford, the developer have read and will comply with all of the requirements specified in this drainage report and plan.

Phillip Buford and Mary Jean Berg Buford

Business Name

By: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

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El Paso County Approval:

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

\_\_\_\_\_  
Jennifer Irvine,  
County Engineer / ECM Administrator

\_\_\_\_\_  
Date

Conditions:

**MASTER DEVELOPMENT DRAINAGE PLAN FOR  
LOT 1177 WOODMEN HILLS FILING #10  
EL PASO COUNTY, COLORADO**

**PURPOSE**

The purpose of this Master Development Drainage Plan (MDDP) is to identify major drainageways; ponding/detention areas; locations of culverts, bridges, and open channels; and drainage areas which are tributary to the proposed development.

**DBPS**

The site lies within the Bennett Ranch Drainage Basin and is covered by the Bennett Ranch Pilot Project Drainage Basin Planning Study, dated November, 2001.

**GENERAL DESCRIPTION**

This MDDP for “LOT 1177 WOODMEN HILLS FILING #10” is an analysis of approximately 31.29 acres located in Section 32, Township 12 South, Range 64 West of the Sixth Principal Meridian, City of Colorado Springs, CO. The site is at 8507 Eastonville Road, on the east corner of the intersection of Judge Orr Road and Eastonville Road. This lot is planned for commercial development.

The site is bounded on the west by Eastonville Road, on the south by Judge Orr Road, on the east by an unplatted parcel (undeveloped), and on the north by Lot 1179 Woodmen Hills Filing # 10 (residential).

The site has previously been studied in the following reports:

“Master Development Drainage Plan, Bennett Ranch, El Paso County, Colorado”, by URS, dated August 11, 2000

“Preliminary Drainage & Erosion Control Report For Woodmen Hills Subdivision Filing 10, El Paso County, Colorado”, by URS, dated September 6, 2000

“Final Drainage & Erosion Control Report For Woodmen Hills Subdivision Filing 10, El Paso County, Colorado”, by URS, dated April 3, 2001

The August 11, 2000 MDDP shows the area of the site as a portion of a basin, with little else in details. The September 6, 2000 PDR shows the area of the site as a portion of a basin with a pond on the site. The April 3, 2001 FDR shows the area of the site as a portion of a basin, with a pond on the site, and four storm pipes discharging into the swale on the west side of the site.

Soils in the study area are shown as mapped by the S.C.S. in the “Soils Survey of El Paso County Area” (see appendix). Soils for this project are 100% Columbine gravelly sandy loam 19 (HSG A).

The site lies within the Bennett Ranch Drainage Basin and runoff ultimately flows into the West Fork of Squirrel Creek.

The study area consists of undeveloped land that has existing vegetation consisting of established native grasses and some shrubs/trees in the existing drainage channels. The site drains from north to south overland, with drainage channels on three sides, and into the Bennett Ranch Drainageway with average slopes of ~4%.

## **EXISTING DRAINAGE CONDITIONS**

There are three existing offsite basins that surface drain onto the site, and the site itself is composed of three basins that drains from north to south. There are also four storm sewers that discharge into the swale on the west side of the site. The Bennett Ranch Drainageway runs along the east side of the site, and a swale runs along the west and south sides of the site. The combined flows from the site, drainage channel, and swale leave the site at the southeast corner.

Offsite Basin OS-Z’s 0.48 acres consists of a landscaping area on an adjacent developed parcel that flows onto the site. Runoff ( $Q_5 = 0.4$  cfs,  $Q_{100} = 1.5$  cfs) channel flows southwest into the swale on Basin EX-A.

Offsite Basin OS-Y’s 3.84 acres consists of residential land (single house). Runoff ( $Q_5 = 2.8$  cfs,  $Q_{100} = 10.7$  cfs) sheet/channel flows south onto Basin EX-B and then continues south overland and along a path that loosely resembles a swale.

Offsite Basin OS-X’s 0.93 acres consists of a strip of land between the curb and the property line.

Runoff ( $Q_5 = 0.4$  cfs,  $Q_{100} = 2.9$  cfs) sheet flows east or north into the swale in Basin EX-A and then follows the channel south or east.

There are four storm sewers that discharge into the swale on the west side of the site and Basin EX-A. These storm sewer networks and the basins they drain are shown and described in the maps/pages from the Woodmen Hills Subdivision Filing 10 FDR.

Runoff ( $Q_5 = 0.8$  cfs,  $Q_{100} = 4.8$  cfs) from Basin EX-A's 6.30 acres sheet flows into a swale and then channel flows along the west and south sides of the site. Design Point A is located near the southeast corner of the site where the swale flows into the Bennett Ranch Drainageway.

Runoff ( $Q_5 = 5.2$  cfs,  $Q_{100} = 34.1$  cfs) from Basin EX-B's 21.1 acres sheet flows south across undeveloped land and into the swale in Basin EX-A. Design Point B is located in the southeast corner of the basin.

Runoff ( $Q_5 = 0.7$  cfs,  $Q_{100} = 4.5$  cfs) from Basin EX-C's 3.91 acres is the portion of Bennett Ranch Drainageway on the site. The drainageway flows from north to south on the eastern edge of the site. Design Point C is located at the southeast corner of the site where the drainageway leaves the site and passes under Judge Orr Road in a culvert.

The Bennett Ranch Drainageway flowlines extends at least 3.4 miles upstream from the site, with multiple forks. The tributary area is primarily residential subdivision and golf course land. There appear to be multiple ponds along the flowlines, with the nearest pond approximately 0.3 mile upstream of the site. The flows entering the site in the Bennett Ranch Drainageway are roughly  $Q_5 = 420$  cfs and  $Q_{100} = 1,860$  cfs per the Bennett Ranch DBPS. The portion of the drainageway near the site is vegetated (grasses mostly) and roughly trapezoidal. There are riprap structures and some areas are covered with riprap (such as at culvert ends). Water from the drainageway eventually reaches the Arkansas River, with two ponds approximately one mile downstream of the site.

Wetlands have been identified in the drainage channels on three sides of the site. The areas are shown on the drainage maps (see appendix).

The Bennett Ranch DBPS calls out a new channel where the channel crosses the site and new box culverts at the Judge Orr Road crossing. The proposed channel changes in the DBPS include a new channel cross section and check structures (roughly four on the site). The DBPS shows new check structures every 234 feet, which is a different spacing than the check structures currently built. Based on the existing riprap check dams in the channel, the new channel has been in place since at least 2006. The Judge Orr Road culvert crossing was improved between 2017 and 2019, with the new culvert being double 12'x8' concrete box culverts. Based on this, the DBPS channel improvements on or adjacent to the site appear to have been previously completed. It is not known if all of the recommended improvements in the DBPS were installed.

## **PROPOSED DRAINAGE CONDITIONS**

The site is planned for commercial development. In the proposed condition the swale and drainageway onsite will remain largely unchanged, and the central portion of the site will be developed. There are currently no specific plans for development of the site. A possible layout for interior roads has been shown on the proposed drainage map, but this is only for a visual aid of how the site could be developed. A swale is proposed along the north property line to divert offsite runoff east to the drainageway, rather than having it flow across the entire site. A possible location and rough footprint for a full spectrum detention stormwater pond has also been shown near the southeast corner of the site. It is expected that the general runoff patterns for the developed site will continue to direct runoff to the southeast corner of the site.

Offsite Basin OS-Z's 0.48 acres consists of a landscaping area on an adjacent developed parcel that flows onto the site. Runoff ( $Q_5 = 0.4$  cfs,  $Q_{100} = 1.5$  cfs) channel flows southwest into the swale on Basin EX-A.

Offsite Basin OS-Y's 3.84 acres consists of residential land (single house). Runoff ( $Q_5 = 2.8$  cfs,  $Q_{100} = 10.7$  cfs) sheet/channel flows south onto Basin PR-1 and will then be diverted east in a swale to the Bennett Ranch Drainageway. The diversion swale may require armoring in steep sections and energy dissipation at the outfall will likely be needed.

Offsite Basin OS-X's 0.93 acres consists of a strip of land between the curb and the property line. Runoff ( $Q_5 = 0.4$  cfs,  $Q_{100} = 2.9$  cfs) sheet flows east or north into the swale in Basin EX-A and then

follows the channel south or east.

Basin EX-A will remain the same in the proposed condition. Runoff ( $Q_5 = 0.8$  cfs,  $Q_{100} = 4.8$  cfs) from Basin EX-A's 6.30 acres sheet flows into a swale and then channel flows along the west and south sides of the site. Design Point A is located near the southeast corner of the site where the swale flows into the Bennett Ranch Drainageway.

The existing swale on the west and south side of the site in Basin EX-A is currently heavily vegetated and appears to be in good condition. Hydraulic analysis will be required to determine the capacity of this swale, which will be included in the final drainage report.

Basin EX-C will remain the same in the proposed condition. Runoff ( $Q_5 = 0.7$  cfs,  $Q_{100} = 4.5$  cfs) from Basin EX-C's 3.91 acres is the portion of Bennett Ranch Drainageway on the site. The drainageway flows from north to south on the eastern edge of the site. Design Point C is located at the southeast corner of the site where the drainageway leaves the site and passes under Judge Orr Road in a culvert. Per the County's May 2017 drainage memo, this culvert is designed to convey the future 100 year storm event ( $Q_{100} = 1,073$  cfs). This is roughly 58% of the developed 100 year flow in the Bennett Ranch DBPS. This culvert was designed to convey the  $Q_{100} = 1,073$  cfs with two feet of internal freeboard.

Basin PR-1's 21.1 acres consists of the central portion of the site. A percent impervious of 95% was assumed for this basin in the developed condition. Runoff ( $Q_5 = 89.2$  cfs,  $Q_{100} = 177.3$  cfs) is expected to flow south to Design Point 1. It is likely a stormwater treatment facility will be constructed near Design Point 1.

The southeast corner of the site is the low point of the site, so it's the most likely location for an onsite stormwater treatment facility. Based on basin PR-1 runoff a stormwater pond was roughly sized to have a footprint of 70,000 square feet (shown as 200'x350' on the drainage map). This assumes the entire basin will be treated at a single location.

The Bennett Ranch Drainageway currently receives runoff from the site and carries it south. There are multiple existing ponds downstream of the site and the Bennett Ranch DBPS proposed many

downstream facilities (check structures and culverts primarily). Some of the proposed facilities have been installed, but it is not known if all of them have been installed. Since the County drainage criteria will require runoff leaving the site be treated to release at predevelopment levels, development of the site is not expected to add any additional flows to the drainageway.

Any new roads on the site are expected to cross the existing swale onsite. Doing this will presumably require new culverts at the crossing locations.

No drainage problems are anticipated for the proposed development, other than those discussed above.

The Bennett Ranch DBPS appears to assume a future land use for the site area of 4DU/AC and 40 % impervious (Figure 2-4). This is substantially different from the proposed commercial use with assumed 95% imperviousness.

In an effort to protect receiving water and as part of the “four-step process to minimize adverse impacts of urbanization” this site was analyzed in the following manner:

1. Reduce Runoff- As no details of the proposed development have been provided and the site plan has only possible development features shown, it is not known if/how runoff would be reduced.
2. Stabilize Drainageways- As no details of the proposed development have been provided and hydraulic calculations are not part of this MDDP, it is not currently known if drainageway stabilization will be necessary for this development.
3. Provide Water Quality Capture Volume (WQCV)- A possible location for an extended detention basin has been shown on the proposed drainage map, that could provide WQCV. As no details of the proposed development have been provided, it is not currently known if this location will be used or what form of water quality treatment will be used.
4. Consider Need for Industrial and Commercial BMPs- The proposed development is for commercial land. As no details of the proposed development have been provided, it is not currently known if commercial BMPs will be warranted, or what form they could take.

## **HYDROLOGIC CALCULATIONS**

Hydrologic calculations were performed using the El Paso County Storm Drainage Design Criteria Manual - Volumes 1 & 2, latest editions. The Rational Method was used to estimate storm water runoff anticipated from design storms with 5-year and 100-year recurrence intervals.

## **FLOODPLAIN STATEMENT**

A portion of this site is within a designated F.E.M.A. floodplain, as determined by Flood Insurance Rate Map No. 08041C0544 G dated December 7, 2018 (see appendix). The floodplain is shown on the drainage maps.

A new road will very likely be built in the floodplain and there may be other development in the floodplain. The existing Judge Orr Road is already in the mapped floodplain, so connecting a new road to it in the floodplain is not expected to raise significant objections. Additional regulatory/administrative requirements are expected. Other types of development in the floodplain could raise major issues, but these issues would depend on the details of what is done. Development in the floodplain may require a LOMR or CLOMR be prepared.

## **DRAINAGE FEES**

It is expected that the County will require drainage fees be paid when this site is platted for commercial use.

## **SUMMARY**

The site is planned for commercial development. The concepts presented in this MDDP are preliminary in nature and will need to be refined in the future final drainage report(s). The existing drainageway that crosses the site already carries runoff from the site.

**PREPARED BY:**  
**TERRA NOVA ENGINEERING, INC.**

Dane Frank, P.E.  
Project Engineer  
Jobs/2015.00/Drainage/201500 MDDP.doc

## **BIBLIOGRAPHY**

“El Paso County Drainage Criteria Manual-Volumes 1 & 2”, latest edition

“El Paso County Board Resolution No 15-042” (Adoption of Chapter 6 and Section 3.2.1 Chapter 13 of the City of Colorado Springs Drainage Criteria Manual dated May 2014, Hydrology and Full Spectrum Detention)

“Bennett Ranch Pilot Project Drainage Basin Planning Study”, by Stormwater & Environmental Consultants, Inc., dated November, 2001

“Master Development Drainage Plan, Bennett Ranch, El Paso County, Colorado”, by URS, dated August 11, 2000

“Preliminary Drainage & Erosion Control Report For Woodmen Hills Subdivision Filing 10, El Paso County, Colorado”, by URS, dated September 6, 2000

“Final Drainage & Erosion Control Report For Woodmen Hills Subdivision Filing 10, El Paso County, Colorado”, by URS, dated April 3, 2001

“Memo: Judge Orr Road Culvert at Bennett Ranch Creek – Drainage, CDOT Project #: ER C040-047, SA 21422, El Paso County Project #: 152626”, by El Paso County Department of Public Works, dated May 2017

SCS Soils Map for El Paso County

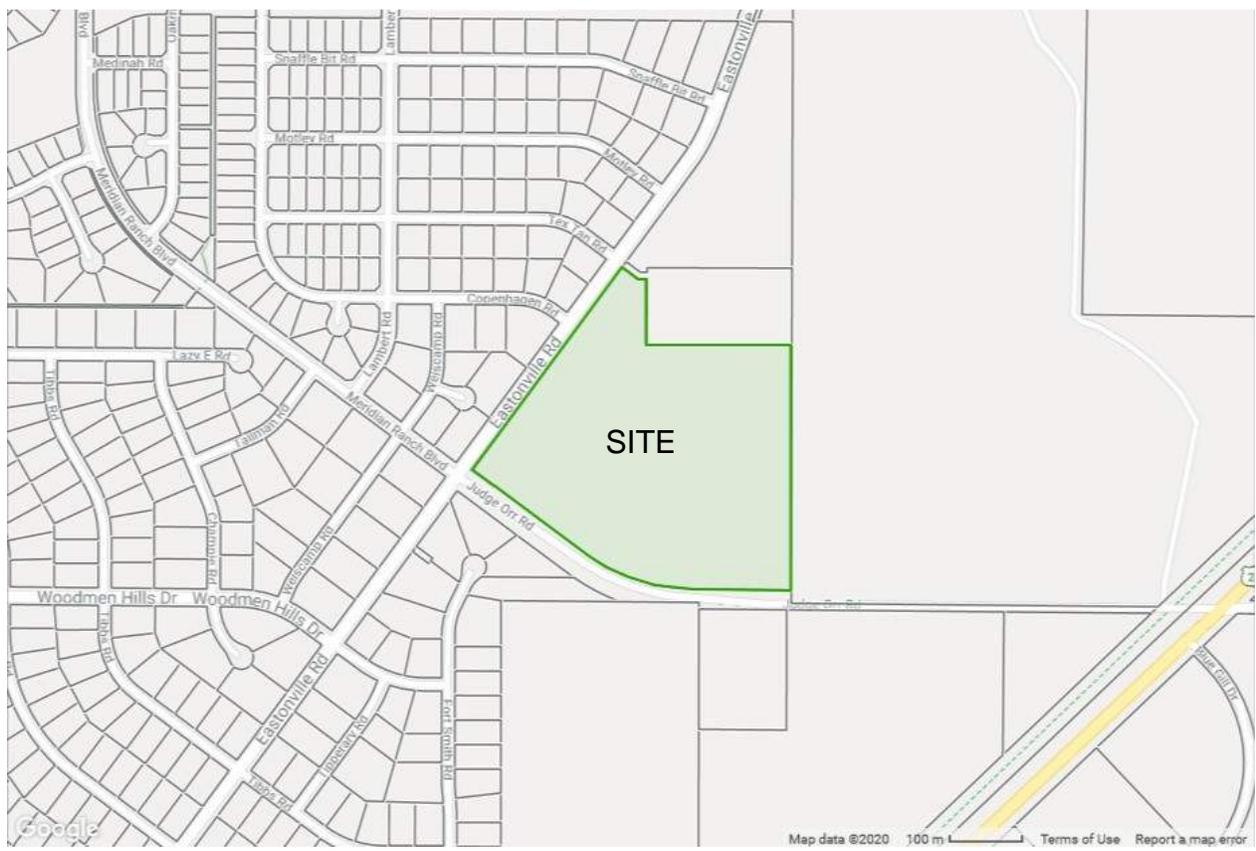
FEMA Floodplain Map

## **VICINITY MAP**

# El Paso County - Community: Property Search

Schedule Number: 4232302003

8507 Eastonville Road  
Vicinity Map



North is up ^^

# 8507 Eastonville Road

Image Dated Oct 2019



**SITE**



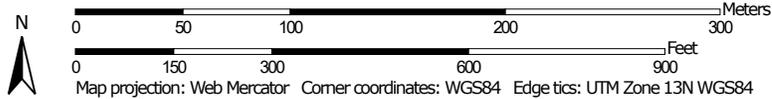
900 ft

**S.C.S. SOILS MAP**

Soil Map—El Paso County Area, Colorado  
(8507 Eastonville Road)



Map Scale: 1:3,500 if printed on A portrait (8.5" x 11") sheet.



## 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 1:24,000.

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: El Paso County Area, Colorado  
Survey Area Data: Version 17, Sep 13, 2019

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

Date(s) aerial images were photographed: Sep 8, 2018—May 26, 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.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	31.9	100.0%
<b>Totals for Area of Interest</b>		<b>31.9</b>	<b>100.0%</b>

## El Paso County Area, Colorado

### 19—Columbine gravelly sandy loam, 0 to 3 percent slopes

#### Map Unit Setting

*National map unit symbol:* 367p  
*Elevation:* 6,500 to 7,300 feet  
*Mean annual precipitation:* 14 to 16 inches  
*Mean annual air temperature:* 46 to 50 degrees F  
*Frost-free period:* 125 to 145 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Columbine and similar soils:* 97 percent  
*Minor components:* 3 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Columbine

##### Setting

*Landform:* Flood plains, fan terraces, fans  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium

##### Typical profile

*A - 0 to 14 inches:* gravelly sandy loam  
*C - 14 to 60 inches:* very gravelly loamy sand

##### Properties and qualities

*Slope:* 0 to 3 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Well drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Very low (about 2.5 inches)

##### Interpretive groups

*Land capability classification (irrigated):* 4e  
*Land capability classification (nonirrigated):* 6e  
***Hydrologic Soil Group:* A**  
*Ecological site:* Gravelly Foothill (R049BY214CO)  
*Hydric soil rating:* No

#### Minor Components

##### Fluvaquentic haplaquolls

*Percent of map unit:* 1 percent

*Landform:* Swales  
*Hydric soil rating:* Yes

**Other soils**

*Percent of map unit:* 1 percent  
*Hydric soil rating:* No

**Pleasant**

*Percent of map unit:* 1 percent  
*Landform:* Depressions  
*Hydric soil rating:* Yes

## Data Source Information

Soil Survey Area: El Paso County Area, Colorado  
Survey Area Data: Version 17, Sep 13, 2019

**FEMA FIRM MAP**

**NOTES TO USERS**

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated detailed flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations (BFEs)** and/or **Floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRMs. Users should be aware that BFEs shown on the FIRMs represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRMs for purposes of construction and/or floodplain management.

**Coastal Base Flood Elevations** shown on this map apply only to landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRMs should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRMs.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The horizontal datum was NAD83, GRS80 spheroid. Differences in datum, horizontal projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. Those differences do not affect the accuracy of the FIRMs.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov> or contact the National Geodetic Survey at the following address:

NGS Information Services  
NOAA, NGS-15  
National Geodetic Survey  
SSM-C-3, #5022  
1315 East-West Highway  
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at <http://www.ngs.noaa.gov>.

**Base Map** information shown on this FIRMs was provided in digital format by El Paso County, Colorado Springs Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRMs for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRMs may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

**Corporate limits** shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels in which each community is located.

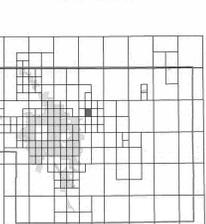
Contact **FEMA Map Service Center (MSC)** via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRMs. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at <http://www.msc.fema.gov/>.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA MAP (1-877-336-2627) or visit the FEMA website at <http://www.fema.gov/business/>.

**El Paso County Vertical Datum Offset Table**

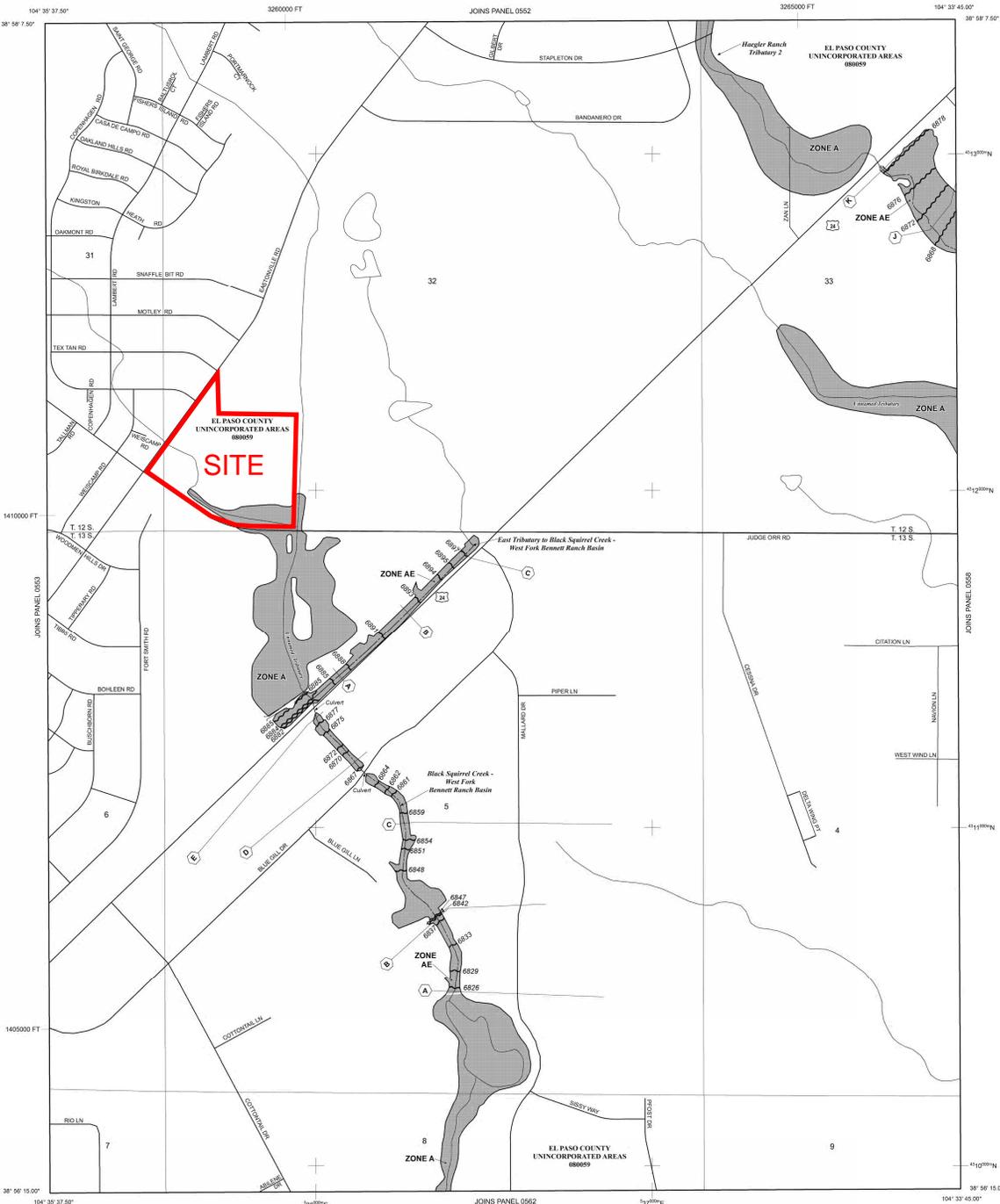
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM-BY-STREAM VERTICAL DATUM CONVERSION INFORMATION	

**Panel Location Map**



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 12 SOUTH, RANGE 64 WEST, AND TOWNSHIP 13 SOUTH, RANGE 64 WEST.

**LEGEND**

**SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. This Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zone A, AE, AO, AV, AR, VE, and V. The base flood elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A**  
No Base Flood Elevations determined.
- ZONE AE**  
Base Flood Elevations determined.
- ZONE AO**  
Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AR**  
Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently determined to be ineffective. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE AV**  
Area to be protected from 1% annual chance flood by a Federal Flood protection system under construction; no Base Flood Elevations determined.
- ZONE VE**  
Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE V**  
Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

**FLOODWAY AREAS IN ZONE AE**

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachments so that the 1% annual chance flood can be carried without substantial increases in flood heights.

- OTHER FLOOD AREAS**
- ZONE X**  
Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of 1 foot or less in any given year. Zone X areas are 1 square mile; and areas protected by levees from 1% annual chance flood.
- UTLIER AREAS**
- ZONE X**  
Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D**  
Areas in which flood hazards are undetermined, but possible.
- COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**
- OTHERWISE PROTECTED AREAS (OPAs)**

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities
- Base Flood Elevation line and value; elevation in feet
- Base Flood Elevation value where uniform within zone; elevation in feet

\* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- Cross section line
- 23-23 Transsect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 100-meter Universal Transverse Mercator grid ticks, zone 13
- 5000-foot grid ticks: Colorado State Plane coordinate system; central zone 10 (FIPS/DOE 500)
- Lambert Conformal Conic Projection
- Bench mark (See explanation in Notes to Users section of this FIRMs report)
- M1.5 River Mile

MAP REPOSITORIES  
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP  
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL  
DECEMBER 1, 2011: To update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.  
To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.



**NATIONAL FLOOD INSURANCE PROGRAM**

**PANEL 0554G**

**FIRM FLOOD INSURANCE RATE MAP**

**EL PASO COUNTY, COLORADO AND INCORPORATED AREAS**

PANEL 554 OF 1300  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COUNTY	COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY		0554G	054	0

Map Number 08041C0554G

MAP REVISED DECEMBER 7, 2018

Federal Emergency Management Agency

## **HYDROLOGIC CALCULATIONS**

**LOT 1177 WOODMEN HILLS FILING #10  
AREA RUNOFF COEFFICIENT (C) SUMMARY**

**EXISTING**

BASIN	TOTAL AREA	DEVELOPED			UNDEVELOPED			WEIGHTED		WEIGHTED CA	
	(Acres)	AREA (Acres)	C5	C100	AREA (Acres)	C5	C100	C5	C100	CA5	CA100
<i>OS-Z</i>	0.48	0.48	0.20	0.44	0.00	0.09	0.36	0.20	0.44	0.10	0.21
<i>OS-Y</i>	3.84	3.84	0.20	0.44	0.00	0.09	0.36	0.20	0.44	0.77	1.69
<i>OS-X</i>	0.93	0.93	0.09	0.36	0.00	0.09	0.36	0.09	0.36	0.08	0.33
<i>EX-A</i>	6.30	0.00	0.09	0.36	6.30	0.09	0.36	0.09	0.36	0.57	2.27
<i>EX-B</i>	21.1	0.00	0.09	0.36	21.10	0.09	0.36	0.09	0.36	1.90	7.60
<i>EX-C</i>	3.91	0.00	0.90	0.96	3.91	0.09	0.36	0.09	0.36	0.35	1.41

**DEVELOPED**

BASIN	TOTAL AREA	DEVELOPED			UNDEVELOPED			WEIGHTED		WEIGHTED CA	
	(Acres)	AREA (Acres)	C5	C100	AREA (Acres)	C5	C100	C5	C100	CA5	CA100
<i>OS-Z</i>	0.48	0.48	0.20	0.44	0.00	0.09	0.36	0.20	0.44	0.10	0.21
<i>OS-Y</i>	3.84	3.84	0.20	0.44	0.00	0.09	0.36	0.20	0.44	0.77	1.69
<i>OS-X</i>	0.93	0.93	0.09	0.36	0.00	0.09	0.36	0.09	0.36	0.08	0.33
<i>EX-A</i>	6.30	0.00	0.09	0.36	6.30	0.09	0.36	0.09	0.36	0.57	2.27
<i>PR-I</i>	21.1	21.10	0.81	0.88	0.00	0.09	0.36	0.81	0.88	17.09	18.57
<i>EX-C</i>	3.91	0.00	0.90	0.96	3.91	0.09	0.36	0.09	0.36	0.35	1.41

Calculated by: DLF

Date: 5/6/2020

Checked by: \_\_\_\_\_

**LOT 1177 WOODMEN HILLS FILING #10  
RUNOFF SUMMARY**

**EXISTING**

BASIN	AREA TOTAL (Acres)	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T <sub>c</sub>	INTENSITY		TOTAL FLOWS	
		C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	Length (ft)	Slope (ft/ft)	T <sub>t</sub> (min)	Length (ft)	Slope (%)	Velocity (fps)	T <sub>t</sub> (min)	TOTAL (min)	I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (c.f.s.)	Q <sub>100</sub> (c.f.s.)
		* For Calcs See Runoff Summary														
<i>OS-Z</i>	0.48	0.20	0.44	0.20	100	0.04	10.3	0	4.0%	1.0	0.0	10.3	4.0	7.0	0.4	1.5
<i>OS-Y</i>	3.84	0.20	0.44	0.20	100	0.02	12.9	0	2.0%	0.7	0.0	12.9	3.7	6.3	2.8	10.7
<i>OS-X</i>	0.93	0.09	0.36	0.09	15	0.02	5.6	0	2.0%	0.7	0.0	5.6	4.9	8.7	0.4	2.9
<i>EX-A</i>	6.30	0.09	0.36	0.09	50	0.21	4.7	2300	1.0%	0.5	76.7	81.4	1.3	2.1	0.8	4.8
<i>EX-B</i>	21.10	0.09	0.36	0.09	300	0.02	25.1	0	2.0%	0.7	0.0	25.1	2.7	4.5	5.2	34.1
<i>EX-C</i>	3.91	0.09	0.36	0.09	75	0.08	8.0	1100	1.0%	0.5	36.7	44.6	2.0	3.2	0.7	4.5

**DEVELOPED**

BASIN	AREA TOTAL (Acres)	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				T <sub>c</sub>	INTENSITY		TOTAL FLOWS	
		C <sub>5</sub>	C <sub>100</sub>	C <sub>5</sub>	Length (ft)	Slope (ft/ft)	T <sub>t</sub> (min)	Length (ft)	Slope (%)	Velocity (fps)	T <sub>t</sub> (min)	TOTAL (min)	I <sub>5</sub> (in/hr)	I <sub>100</sub> (in/hr)	Q <sub>5</sub> (c.f.s.)	Q <sub>100</sub> (c.f.s.)
		* For Calcs See Runoff Summary														
<i>OS-Z</i>	0.48	0.20	0.44	0.20	100	0.04	10.3	0	4.0%	1.0	0.0	10.3	4.0	7.0	0.4	1.5
<i>OS-Y</i>	3.84	0.20	0.44	0.20	100	0.02	12.9	0	2.0%	0.7	0.0	12.9	3.7	6.3	2.8	10.7
<i>OS-X</i>	0.93	0.09	0.36	0.09	15	0.02	5.6	0	2.0%	0.7	0.0	5.6	4.9	8.7	0.4	2.9
<i>EX-A</i>	6.30	0.09	0.36	0.09	50	0.21	4.7	2300	1.0%	0.5	76.7	81.4	1.3	2.1	0.8	4.8
<i>PR-I</i>	21.10	0.81	0.88	0.81	100	0.02	4.2	0	2.0%	0.7	0.0	4.2	5.2	9.5	89.2	177.3
<i>EX-C</i>	3.91	0.09	0.36	0.09	75	0.08	8.0	1100	1.0%	0.5	36.7	44.6	2.0	3.2	0.7	4.5

Calculated by:                      DLF

Date:                      5/6/2020

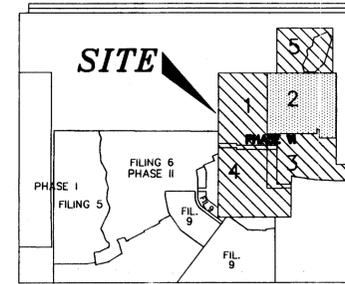
Checked by:



**PAGES FROM HISTORIC REPORTS**

# FINAL DRAINAGE PLAN

## WOODMEN HILLS SUBDIVISION FILING No. 10

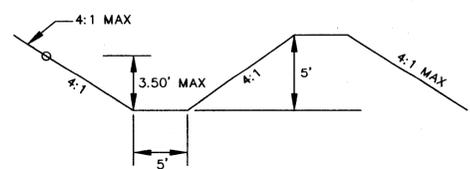
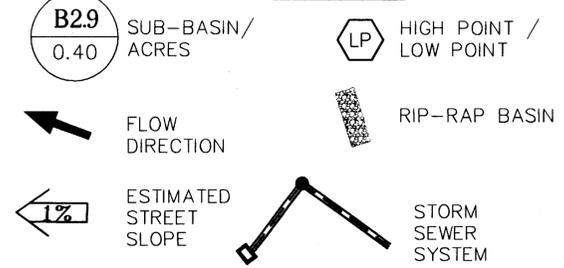


**INDEX MAP**

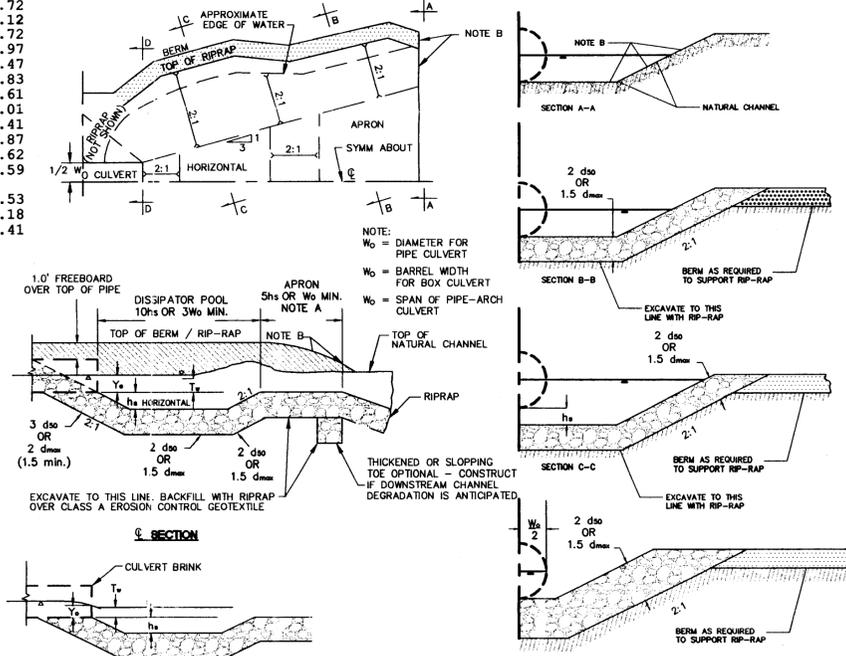
N.T.S.  
 [Hatched Box] = SHEET NUMBERS  
 [Numbered Box] = THIS SHEET

Basin Name	Area acres	Q5 cfs	Q100 cfs
B3.12	0.14	0.22	0.49
B3.13	0.33	0.50	1.10
B3.14	0.34	0.47	1.04
B3.15	0.35	0.50	1.11
B3.16	0.44	0.74	1.63
B4.1	5.27	5.11	11.43
B4.2	1.79	2.32	5.12
B4.3	7.72	7.32	16.36
B4.4	2.06	2.77	6.11
B4.5	1.65	2.14	4.72
B4.6	6.05	5.87	13.12
B4.7	1.59	2.14	4.72
B4.8	1.34	1.80	3.97
B4.9	4.72	4.68	10.47
B4.10	1.29	1.73	3.83
B4.11	0.78	1.18	2.61
B4.12	2.65	2.68	6.01
B4.13	1.75	1.99	4.41
B4.15	0.61	0.85	1.87
B4.16	0.46	0.73	1.62
B4.17	0.41	0.72	1.59
B5.1	0.13	0.24	0.53
B5.2	2.59	2.76	6.18
B5.3	0.38	0.64	1.41

**LEGEND**



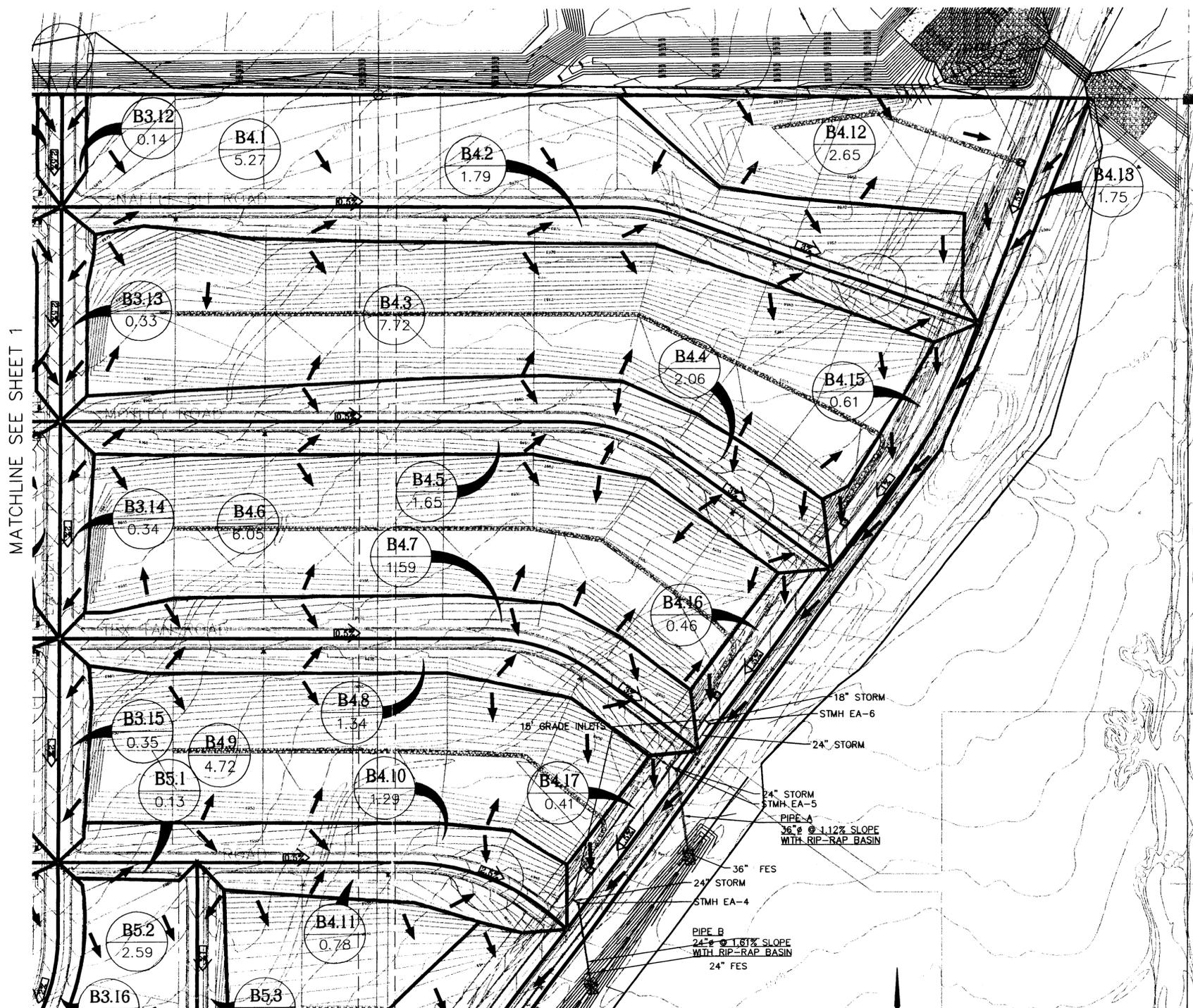
NOTE A - IF EXIT VELOCITY OF BASIN IS GREATER THAN SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS-SECTIONAL AREA AT SECTION A-A SUCH THAT  $Q_{max} / (CROSS SECTION AREA AT SEC. A-A) = SPECIFIED EXIT VELOCITY$   
 NOTE B - RIP-RAP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIP-RAP IN FLOOR OF BASIN SHOULD BE AT THE SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A



**RIP-RAP ENERGY DISSIPATION POOL DETAIL**  
SCALE: N. T. S.

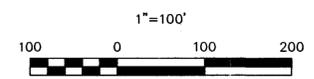
Rip-Rap Basin Design

Pipe Number	Tw	Yc	Ys	Tw/Yc	Rip-Rap	d50	h	h/Yc	h/d50	10*h	5*h	3*d50	2*dmax	2*d50 OR 1.5*dmax
A	1.44'	2.19'	1.53'	0.76'	VL	6"	1.06'	0.69'	2.12'	10.6'	5.3'	2'		1.5'
B	1.44'	1.68'	1.09'	1.02'	VL	6"	0.74'	0.68'	1.48'	7.4'	3.7'	2'		1.5'
C	3.77'	3.11'	2.51'	0.94'	VL	6"	2.06'	0.82'	4.13'	20.6'	10.3'	2'		1.5'
D	3.77'	3.63'	2.82'	0.84'	VL	6"	2.89'	1.02'	5.78'	28.9'	14.5'	2'		1.5'



MATCHLINE SEE SHEET 1

MATCHLINE SEE SHEET 3

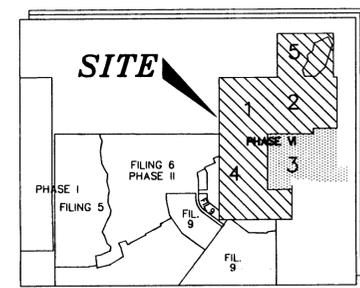
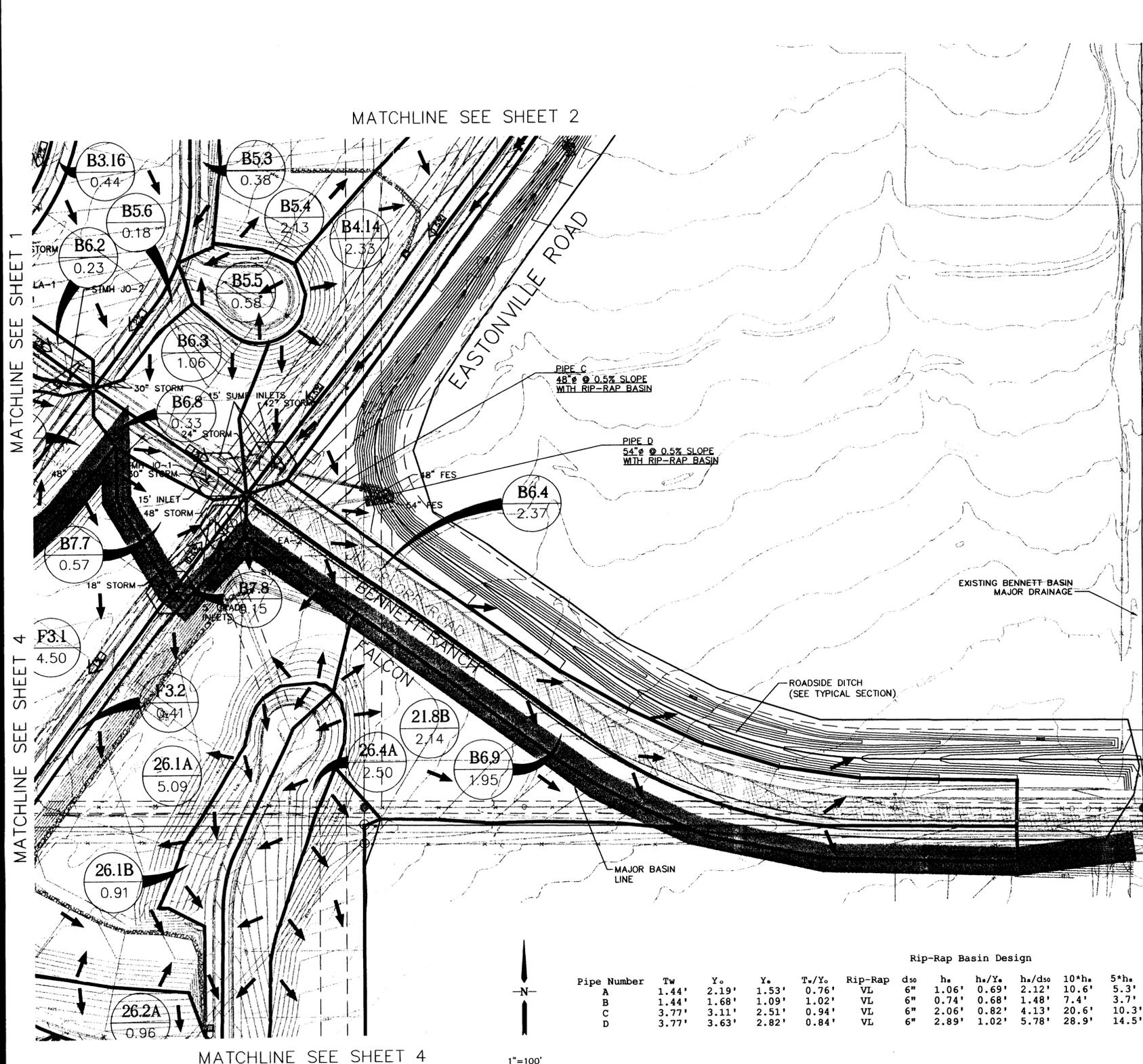


**WOODMEN HILLS**  
ROOM TO GROW

**URS**  
 8415 EXPLORER DRIVE, STE 110  
 COLORADO SPRINGS, CO 80920  
 (719) 531-0001  
**FIGURE 7**  
**SHEET 2 OF 5**

# FINAL DRAINAGE PLAN

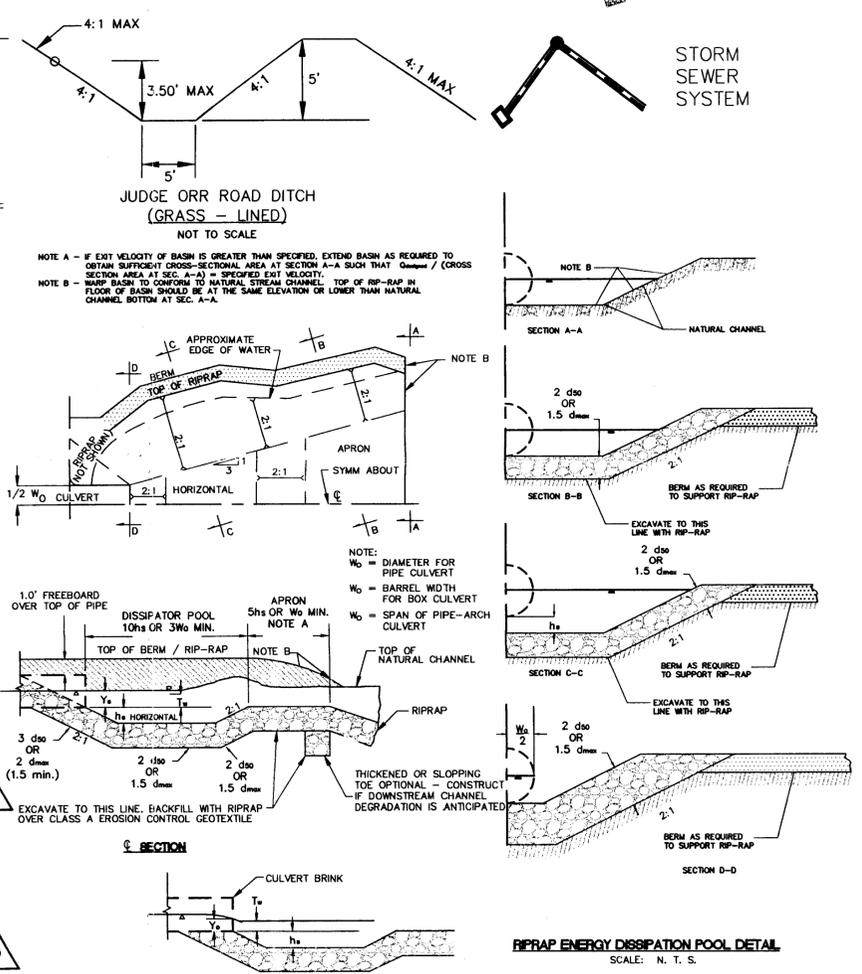
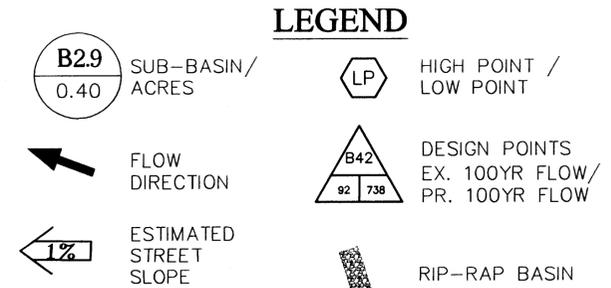
## WOODMEN HILLS SUBDIVISION FILING No. 10



**INDEX MAP**  
N.T.S.

# = SHEET NUMBERS  
# = THIS SHEET

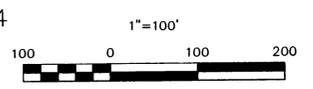
Basin Name	Area acres	Q5 cfs	Q100 cfs
B3.16	0.44	0.74	1.63
B4.14	2.33	2.57	5.71
B5.3	0.38	0.64	1.41
B5.4	2.13	2.50	5.51
B5.5	0.58	0.97	2.15
B5.6	0.18	0.32	0.70
B6.2	0.23	0.42	0.93
B6.3	1.06	1.28	2.81
B6.4	2.37	2.78	6.13
B6.8	0.33	0.53	1.16
B6.9	1.95	2.22	4.91
B7.7	0.15	0.17	0.38
B7.8	0.57	0.96	2.11
F3.1	4.50	4.36	9.76
F3.2	0.41	0.75	1.66
21.8B	2.14	2.21	4.96
26.1A	5.09	4.54	10.12
26.1B	0.91	1.38	3.05
26.2A	0.96	1.61	3.55
26.4A	2.50	3.36	7.41



FILING 10 DEVELOPED	BENNETT RANCH DEVELOPED
COMBINED DEVELOPED	HISTORIC

Rip-Rap Basin Design

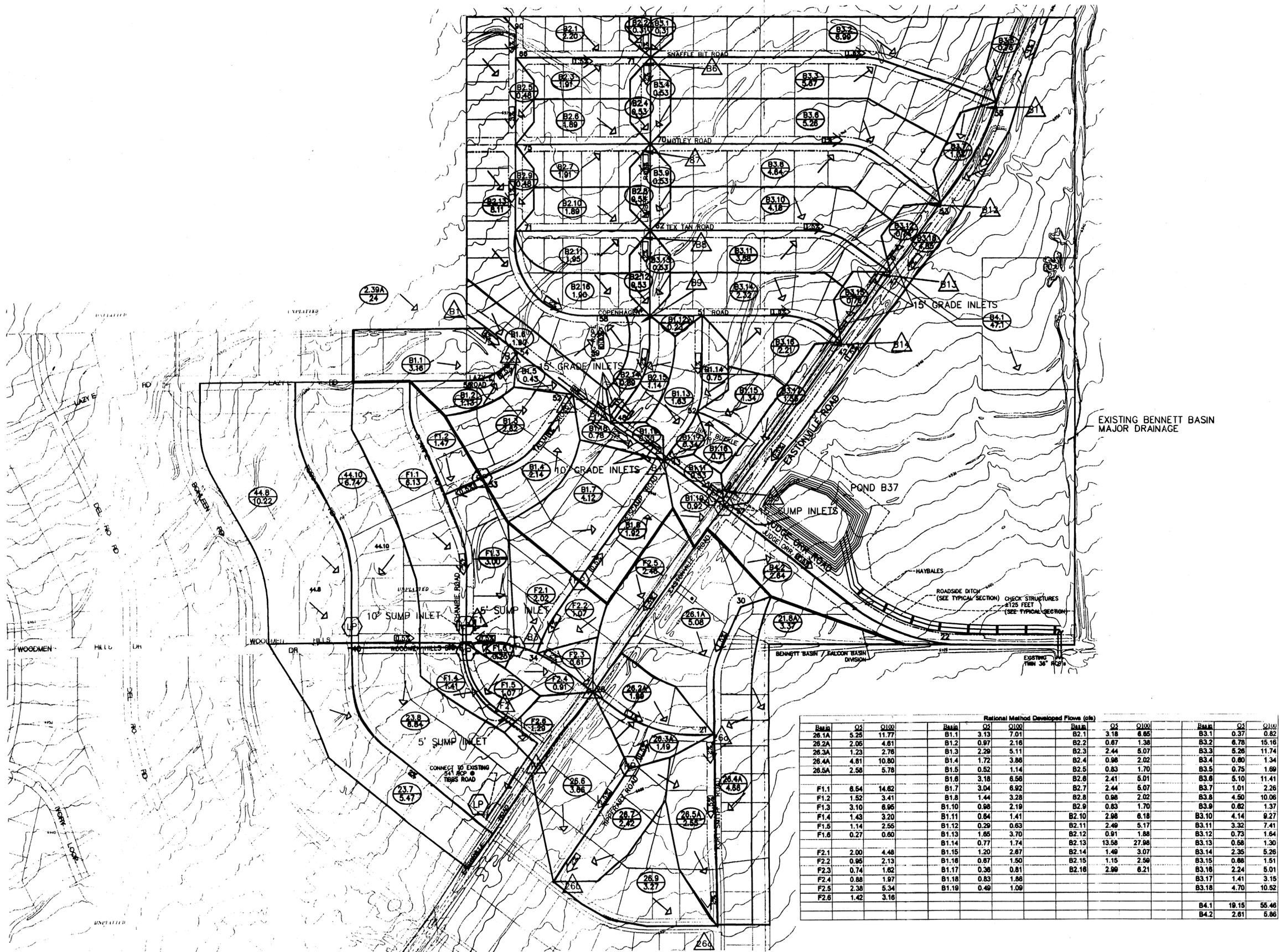
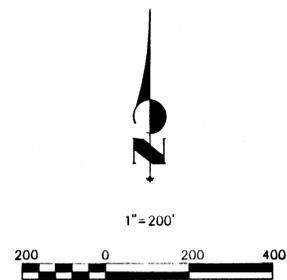
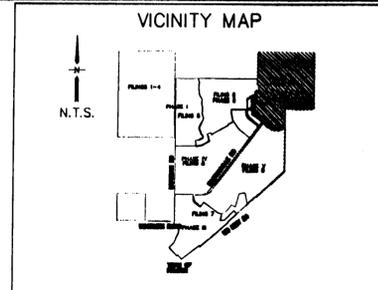
Pipe Number	Tw	Yo	Ye	T/Yo	Rip-Rap	d50	h <sub>a</sub>	h <sub>v</sub> /Y <sub>o</sub>	h <sub>v</sub> /d50	10*h <sub>a</sub>	5*h <sub>a</sub>	3*d50 or 2*d <sub>max</sub>	2*d50 or 1.5*d <sub>max</sub>
A	1.44'	2.19'	1.53'	0.76'	VL	6"	1.06'	0.69'	2.12'	10.6'	5.3'	2'	1.5'
B	1.44'	1.68'	1.09'	1.02'	VL	6"	0.74'	0.68'	1.48'	7.4'	3.7'	2'	1.5'
C	3.77'	3.11'	2.51'	0.94'	VL	6"	2.06'	0.82'	4.13'	20.6'	10.3'	2'	1.5'
D	3.77'	3.63'	2.82'	0.84'	VL	6"	2.89'	1.02'	5.78'	28.9'	14.5'	2'	1.5'



**WOODMEN HILLS**  
ROOM TO GROW

**URS**  
8415 EXPLORER DRIVE, STE 110  
COLORADO SPRINGS, CO 80920  
(719) 531-0001  
**FIGURE 7**  
**SHEET 3 OF 5**

# FINAL DRAINAGE PLAN WOODMEN HILLS SUBDIVISION FILING No. 10



## LEGEND

- B3.9  
4.55 SUB-BASIN/  
ACRES
- ↓ FLOW  
DIRECTION
- 25 DESIGN  
POINTS
- LP HIGH POINT /  
LOW POINT
- 33 ESTIMATED  
STREET  
SLOPE
- STORM  
SEWER

Rational Method Developed Flows (cfs)											
Basin	Q5	Q100	Basin	Q5	Q100	Basin	Q5	Q100	Basin	Q5	Q100
26.1A	5.25	11.77	B1.1	3.13	7.01	B2.1	3.18	6.65	B3.1	0.37	0.82
26.2A	2.05	4.61	B1.2	0.97	2.16	B2.2	0.67	1.38	B3.2	6.78	15.16
26.3A	1.23	2.76	B1.3	2.29	5.11	B2.3	2.44	5.07	B3.3	5.26	11.74
26.4A	4.81	10.80	B1.4	1.72	3.86	B2.4	0.98	2.02	B3.4	0.60	1.34
26.5A	2.58	5.78	B1.5	0.52	1.14	B2.5	0.83	1.70	B3.5	0.75	1.69
F1.1	6.54	14.62	B1.6	3.18	6.56	B2.6	2.41	5.01	B3.6	5.10	11.41
F1.2	1.52	3.41	B1.7	3.04	6.92	B2.7	2.44	5.07	B3.7	1.01	2.26
F1.3	3.10	6.95	B1.8	1.44	3.28	B2.8	0.98	2.02	B3.8	4.50	10.06
F1.4	1.43	3.20	B1.10	0.98	2.19	B2.9	0.83	1.70	B3.9	0.62	1.37
F1.5	1.14	2.55	B1.11	0.64	1.41	B2.10	2.98	6.18	B3.10	4.14	9.27
F1.6	0.27	0.60	B1.12	0.29	0.63	B2.11	2.49	5.17	B3.11	3.32	7.41
F2.1	2.00	4.46	B1.13	1.65	3.70	B2.12	0.91	1.86	B3.12	0.73	1.64
F2.2	0.95	2.13	B1.14	0.77	1.74	B2.13	13.56	27.98	B3.13	0.58	1.30
F2.3	0.74	1.62	B1.15	1.20	2.67	B2.14	1.49	3.07	B3.14	2.35	5.28
F2.4	0.88	1.97	B1.16	0.87	1.90	B2.15	1.15	2.59	B3.15	0.86	1.91
F2.5	2.38	5.34	B1.17	0.36	0.81	B2.16	2.99	6.21	B3.16	2.24	5.01
F2.6	1.42	3.16	B1.18	0.83	1.86				B3.17	1.41	3.15
			B1.19	0.49	1.09				B3.18	4.70	10.52
									B4.1	19.15	55.46
									B4.2	2.61	5.86

WOODMEN HILLS

ROOM TO GROW

URS

8415 EXPLORER DRIVE, STE 110  
COLORADO SPRINGS, CO 80920  
(719) 531-0001

FIGURE 8

## **DRAINAGE MAPS**

**NOTES**

1. A PORTION OF THE SITE IS WITHIN A 100 YEAR FEMA FLOOD PLAIN.
2. OFFSITE BASIN OS-X IS A STRIP OF LAND BETWEEN THE CURB AND PROPERTY LINE. THIS BASIN DRAINS INTO THE ADJACENT SWALE FOR ITS ENTIRE LENGTH.

# LOT 1177 WOODMEN HILLS FILING #10

EL PASO COUNTY, CO

## EXISTING DRAINAGE MAP

OCTOBER 2020

PLAT NAME

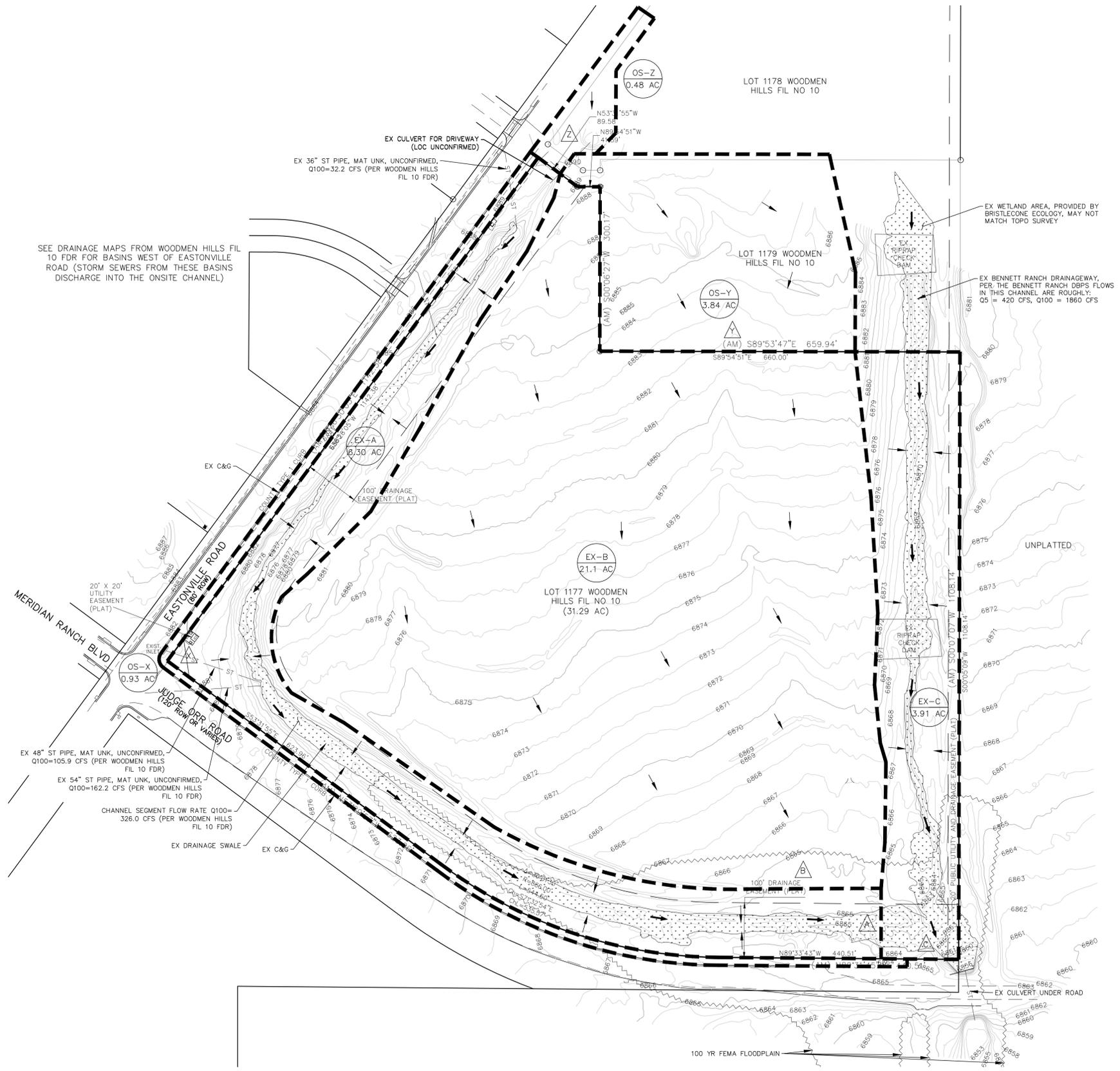
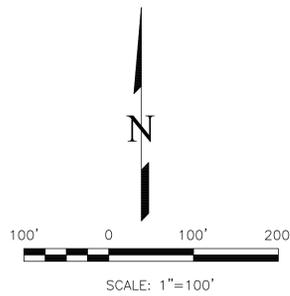
LOT 1177 WOODMEN HILLS FIL NO 10

**DRAINAGE SUMMARY**

DESIGN POINT	BASIN TRIBUTARY	AREA (ACRES)	FLOW	
			5 YR (cfs)	100 YR (cfs)
Z	OS-Z	0.48	0.4	1.5
Y	OS-Y	3.84	2.8	10.7
X	OS-X	0.93	0.4	2.9
A	EX-A	6.30	0.8	4.8
B	EX-B	21.1	5.2	34.1
C	EX-C	3.91	0.7	4.5

**LEGEND**

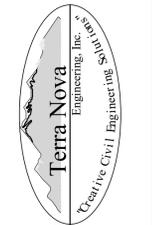
-  BASIN DESIGNATION
-  AREA IN BASIN (AC)
-  DESIGN POINT
-  BASIN BOUNDARY
-  ROAD AND DITCH FLOW DIRECTION
-  GROUND SURFACE FLOW DIRECTION
-  EXISTING CONTOURS - MINOR
-  EXISTING CONTOURS - MAJOR
-  PROPOSED
-  EXISTING
-  SETBACK LINE
-  UNDERGROUND GAS LINE
-  UNDERGROUND ELECTRIC LINE
-  BARBED WIRE FENCE
-  UNDERGROUND WATER LINE
-  SANITARY SEWER LINE
-  STORM SEWER LINE
-  SANITARY SEWER MANHOLE
-  WATER VALVE
-  FIRE HYDRANT
-  100 YEAR FLOODPLAIN



REVISIONS	NO.	DESCRIPTION	DATE

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE ENGINEERING, ARCHITECTURE, AND LANDSCAPE ARCHITECTURE BOARD OF THE STATE OF COLORADO, THESE DRAWINGS ARE NOT TO BE USED FOR ANY OTHER PROJECT WITHOUT WRITTEN AUTHORIZATION.

PREPARED FOR:  
**NES, INC.**  
 ATTN: JOHN MAYNARD  
 619 N CASCADE AVE, #200  
 COLORADO SPRINGS, CO 80903  
 713.471.0073



721 S. 2960 STREET  
 COLORADO SPRINGS, CO 80904  
 OFFICE: 719-635-6422  
 FAX: 719-635-6426  
 www.treaninc.com

**LOT 1177 WOODMEN HILLS FILING #10**  
 EXISTING DRAINAGE MAP

DESIGNED BY DLF  
 DRAWN BY DLF  
 CHECKED BY LD  
 H-SCALE AS NOTED  
 V-SCALE N/A  
 JOB NO. 2015.00  
 DATE ISSUED 10/30/20  
 SHEET NO. 1 OF 2

N:\jobs\2015.00\Drawings\201500 FDM.dwg, 10/30/2020 10:36:03 AM

**NOTES**

1. A PORTION OF THE SITE IS WITHIN A 100 YEAR FEMA FLOOD PLAIN.  
 2. OFFSITE BASIN OS-X IS A STRIP OF LAND BETWEEN THE CURB AND PROPERTY LINE. THIS BASIN DRAINS INTO THE ADJACENT SWALE FOR ITS ENTIRE LENGTH.

# LOT 1177 WOODMEN HILLS FILING #10

## EL PASO COUNTY, CO

### PROPOSED DRAINAGE MAP

#### OCTOBER 2020

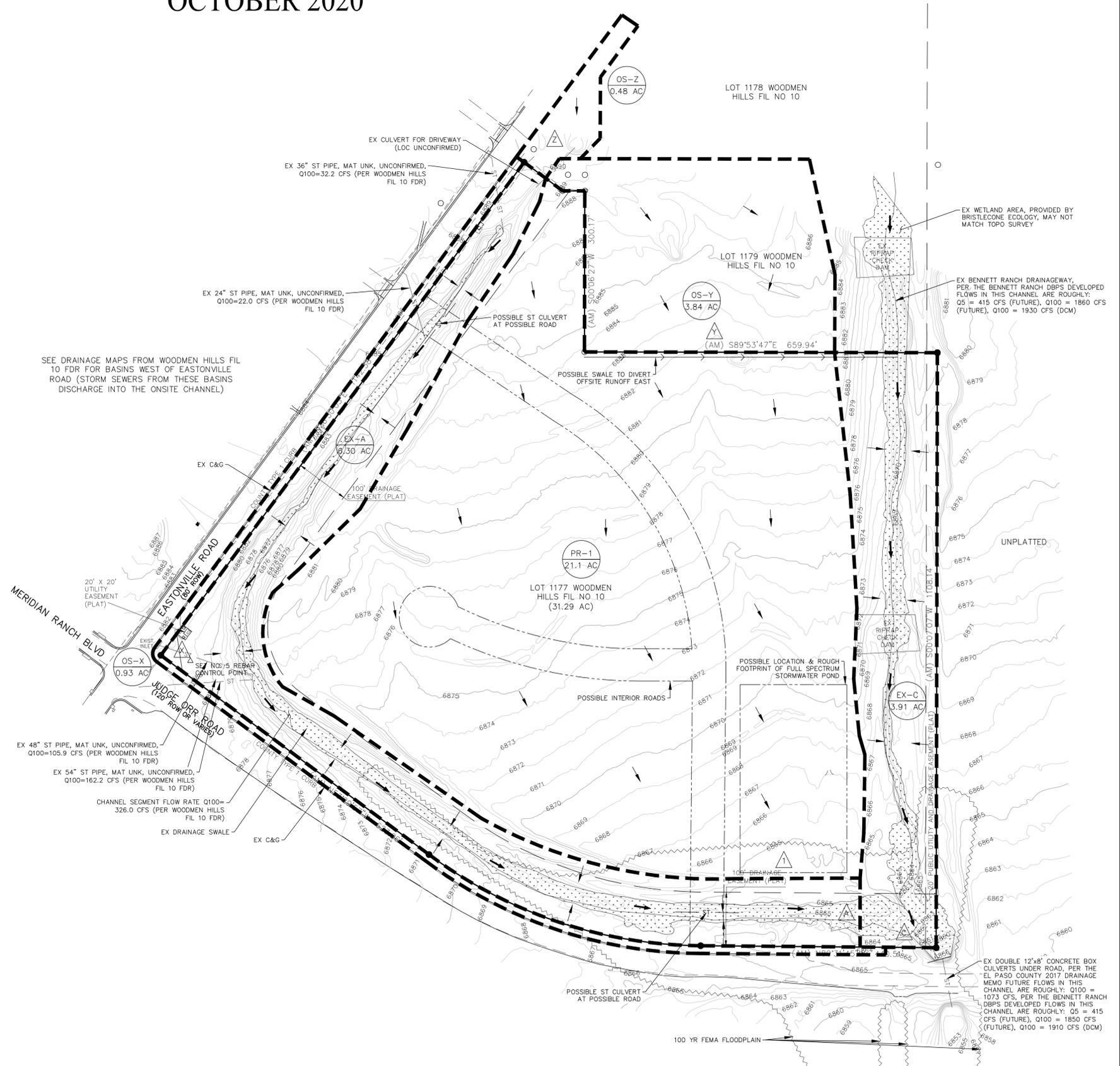
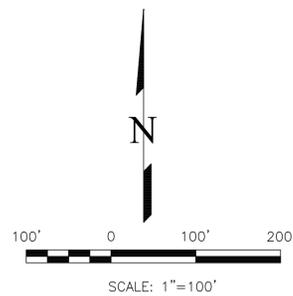
PLAT NAME  
 LOT 1177 WOODMEN HILLS FIL NO 10

**DRAINAGE SUMMARY**

DESIGN POINT	BASIN TRIBUTARY	AREA (ACRES)	FLOW	
			5 YR (cfs)	100 YR (cfs)
Z	OS-Z	0.48	0.4	1.5
Y	OS-Y	3.84	2.8	10.7
X	OS-X	0.93	0.4	2.9
A	EX-A	6.30	0.8	4.8
1	PR-1	21.1	89.2	177.3
C	EX-C	3.91	0.7	4.5

**LEGEND**

- BASIN DESIGNATION
- AREA IN BASIN (AC)
- DESIGN POINT
- BASIN BOUNDARY
- ROAD AND DITCH FLOW DIRECTION
- GROUND SURFACE FLOW DIRECTION
- EXISTING CONTOURS - MINOR
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- SANITARY SEWER LINE
- STORM SEWER LINE
- SANITARY SEWER MANHOLE
- WATER VALVE
- FIRE HYDRANT
- PROPOSED RETAINING WALL



<p>REVISIONS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">NO.</th> <th style="width: 85%;">DESCRIPTION</th> <th style="width: 10%;">DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	NO.	DESCRIPTION	DATE										<p>UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE ENGINEERING AGENCIES, THE REVIEWING AGENCIES, THE TERRA NOVA ENGINEERING, INC. APPROVES THEIR USE ONLY FOR THE PROJECT AND FOR THE DESIGN AUTHORIZED BY WRITTEN AUTHORIZATION.</p> <p>PREPARED FOR:  <b>NES, INC.</b>                  ATTN: JOHN MAYNARD                  619 N CASCADE AVE, #200                  COLORADO SPRINGS, CO 80903                  713.471.0073</p> <div style="text-align: center;">                   Terra Nova                  Engineering, Inc.                  A Professional Engineering Firm             </div> <p>721 S. 29th STREET                  COLORADO SPRINGS, CO 80904                  OFFICE: 719-635-6422                  FAX: 719-635-6426                  www.tneshinc.com</p>	<p>DESIGNED BY DLF                  DRAWN BY DLF                  CHECKED BY LD</p> <p>H-SCALE AS NOTED                  V-SCALE N/A</p> <p>JOB NO. 1973.00                  DATE ISSUED 10/30/20                  SHEET NO. 2 OF 2</p>
NO.	DESCRIPTION	DATE												

LOT 1177 WOODMEN HILLS FILING #10  
 PROPOSED DRAINAGE MAP

DESIGNED BY DLF  
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 H-SCALE AS NOTED  
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 JOB NO. 1973.00  
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