DRAINAGE LETTER REPORT

for

7720 VENTURE STREET – STORAGE YARD
LOT 2, MARKSHEFFEL BUSINESS CENTER FILING NO. 1

Prepared for:

RBNB Venture LLC
210 Saint Paul St., Apt. 204
Denver, CO 80206

September 16, 2026

Prepared by:

19 E. Willamette Ave.
Colorado Springs, CO 80903
(719)-477-9429
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JPS Project No. 072601
PCD File No. PPR26_27

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DRAINAGE LETTER REPORT
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DRAINAGE 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 master plan of the drainage basin. I accept responsibility for liability caused by negligent acts, errors or omissions on my part in preparing this report.

_____

John P. Schwab, CO P.E. No. 29891

Developer's Statement:

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

By:

_____

RBNB Venture LLC Date

210 Saint Paul St., Apt. 204, Denver, CO 80206

Please include developer name per standard signature block template

El Paso County's Statement

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

_____

Joshua J. Palmer, P.E. Date

County Engineer / ECM Administrator

Conditions:

I. INTRODUCTION

A. Property Location and Description

RBNB Venture LLC (Owner) is proposing to utilize the vacant lot 1.7-acre lot at 7720 Venture Street as a Storage Yard. The property is platted as Lot 2, Marksheffel Business Center Filing No. 1 (El Paso County Assessor's Parcel No. 54050-01-002), located along the west side of Marksheffel Road, south of Constitution Avenue. The existing site consists of a paved area along the easterly side of the lot, enclosed by existing fencing. The proposed Site Development Plan consists of utilization of the existing paved area on Lot 2 as a Storage Yard.

The site is zoned Industrial (I-3), and the proposed storage use is consistent with the existing zoning. The property adjoins developed commercial and industrial properties to the north, east, and south. A 60-foot right-of-way reserved for Palmer Park Boulevard adjoins the north boundary of the property, and a 5.2-acre unplatted tract owned by Waste Connections of Colorado Inc. is located to the northeast.

Venture Street is a fully improved public street along the south boundary of the site, terminating in an existing cul-de-sac. A 4.5-acre developed office/warehouse property (platted as Lot 4, Marksheffel Business Center Filing No. 1) is located on the south side of Venture Street, across from this site.

The major drainage channel of the East Fork of Sand Creek adjoins thew west boundary of this site. A vacant, unplatted 22.9-acre parcel owned by Marksheffel Business Center LLC (zoned PUD) is located on the west side of the drainage channel.

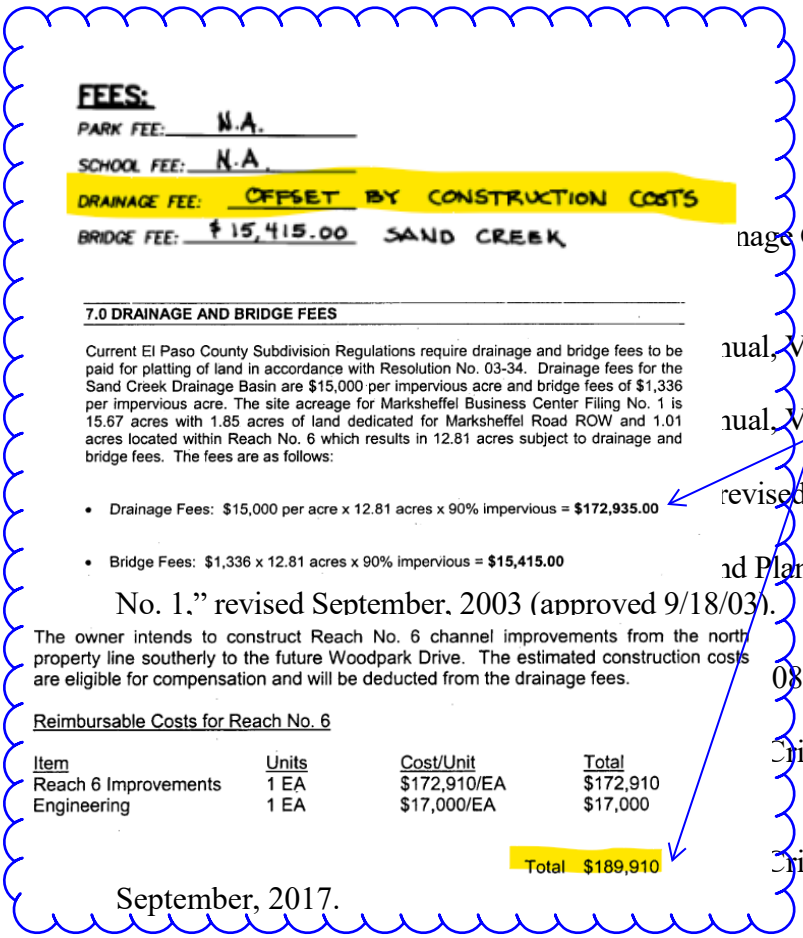
The east boundary of the property adjoins a developed 2.1-acre warehouse / storage site platted as Lot 1, Marksheffel Business Center Filing No. 1. The adjoining property to the east is owned by the same owner (RBNB Venture LLC) as the subject Lot 2, and the proposed Storage Yard on Lot 2 will connect to the existing parking lot on the west side of Lot 1 and be served by the existing Lot 1 access drive.

The total non-excluded disturbed area associated with this project is 0.98 acres. Based on the land disturbance remaining under one acre, water quality facilities are not required as the project is not classified as an "applicable construction activity" in accordance with Section I.6.1 of the El Paso County Engineering Criteria Manual (ECM). Previously disturbed areas beyond the limits of the proposed storage yard will be restored to historic / undeveloped conditions.

This project is considered an "applicable construction activity" since >1 ac will be disturbed. However, with the exclusions discussed in the report there will be <1 ac of unexcluded disturbed area, so water quality treatment is not required for the site. Please rephrase this paragraph to clarify.

B. Scope

In support of the Site Development Plan submittal to El Paso County, this report is intended to meet the requirements of a Drainage Letter Report in accordance with El Paso County drainage criteria. This report will provide a summary of site drainage issues impacting the proposed development.



FEES:

PARK FEE: N.A.

SCHOOL FEE: N.A.

DRAINAGE FEE: OFFSET BY CONSTRUCTION COSTS

BRIDGE FEE: $15,415.00 SAND CREEK

7.0 DRAINAGE AND BRIDGE FEES

Current El Paso County Subdivision Regulations require drainage and bridge fees to be paid for platting of land in accordance with Resolution No. 03-34. Drainage fees for the Sand Creek Drainage Basin are $15,000 per impervious acre and bridge fees of $1,336 per impervious acre. The site acreage for Marksheffel Business Center Filing No. 1 is 15.67 acres with 1.85 acres of land dedicated for Marksheffel Road ROW and 1.01 acres located within Reach No. 6 which results in 12.81 acres subject to drainage and bridge fees. The fees are as follows:

- Drainage Fees: $15,000 per acre x 12.81 acres x 90% impervious = **$172,935.00**
- Bridge Fees: $1,336 x 12.81 acres x 90% impervious = **$15,415.00**

The owner intends to construct Reach No. 6 channel improvements from the north property line southerly to the future Woodpark Drive. The estimated construction costs are eligible for compensation and will be deducted from the drainage fees.

Reimbursable Costs for Reach No. 6

Item	Units	Cost/Unit	Total
Reach 6 Improvements	1 EA	$172,910/EA	$172,910
Engineering	1 EA	$17,000/EA	$17,000
		Total	$189,910

nage Criteria Manual," revised October 31,

nual, Volume 1," revised January, 2021.

nual, Volum

revised July 18, 2023.

The drainage basin/bridge fees were credited as reimbursable costs toward the design and construction of the channel improvements.

d Plan, Marksheffel Business Center Filing No. 1," revised September, 2003 (approved 9/18/03).

08041C0756G, December 7, 2018.

riteria Manual, Volume 1," revised

riteria Manual, Volume 2," revised September, 2017.

Mile High Flood District, "Urban Storm Drainage Criteria Manual, Volume 3," revised January, 2021.

It does not appear that channel improvements were completed. Please address.

Is the channel actively eroding along the western side of the property? Please address if any mitigations are needed to prevent further erosion of this property into the channel.

Please include if there is relevant history regarding which properties/developments are responsible for the channel improvements.

II. EXISTING AND PROPO

According to the Natural Resources this site, the on-site soils are compr moderately well drained soils are cl infiltration rate).

Subdivision Drainage Report

Drainage planning for this site was previously addressed in the "Final Drainage Report (FDR) and Plan, Marksheffel Business Center Filing No. 1," revised September, 2003 by Drexel-Barrell & Co. (see excerpts in Appendix A). The FDR was prepared in support of the subdivision which created four commercial / industrial lots along Venture Street, extending west from Marksheffel Road. Development of the subdivision included channel improvements to the East Fork of Sand Creek along the west side of Lot 2, as recommended in the "Sand Creek Drainage Basin Planning Study."

The subject property (Lot 2) is located within "Basin F" (1.71-acres) as delineated in the subdivision drainage report, and developed flows from this basin are described as flowing southwesterly to a riprap channel at the west end of the Venture Street cul-de-sac. The riprap channel conveys the developed flow from Lots 1 and 2 and the Venture Street

roadway westerly into the adjoining East Fork Sand Creek channel. The FDR calculated developed peak flows for Basin F as $Q_5 = 7.5$ cfs and $Q_{100} = 13.1$ cfs.

While the subdivision drainage report identified the southeast corner of Lot 2 as being within the adjoining Basin A, the as-built conditions in the adjoining Lot 1 direct site drainage in a swale flowing south along the west boundary of Lot 1 into Venture Street.

The subdivision drainage report identified all of Basin F as "Heavy Industrial," with runoff coefficients of $C_{10} = 0.8$ cfs and $C_{100} = 0.9$, which equates to a developed impervious area of 90 percent (per DCM Table 5-1).

Historic Site Drainage Conditions

Surface drainage from this site flows southwesterly to the existing grouted riprap channel at the west end of Venture Street, which flows into the adjoining East Fork Sand Creek Channel, which flows southwest Sand Creek and ultimately flows to Fountain Creek (ultimate receiving water).

As shown on the enclosed "Existing Conditions Drainage Plan" (Figure EX1), Lot 1 has been delineated as Basin F (1.66 acres), and surface drainage from Basin F sheet flows southwesterly to Design Point F at the southwest corner of the property. Historic flows from Basin F (Design Point F) are calculated as $Q_5 = 0.5$ cfs and $Q_{100} = 3.3$ cfs.

Proposed Site Drainage Conditions

As shown on the enclosed Developed Drainage Plan (Figure D1), the developed area of this project is limited to approximately 0.98 acres. The developed Lot 1 has been delineated as Basin F (1.66 acres), and surface drainage from Basin F will continue to flow southwesterly by sheet flow, curb and gutter, and a curb chase draining to Design Point F at the southwest corner of the property. Developed flows from Basin F (Design Point F) are calculated as $Q_5 = 3.5$ cfs and $Q_{100} = 6.4$ cfs (well below the calculated flow in the FDR).

Proposed site improvements will include new curb and gutter along the west edge of the existing asphalt storage area to ensure no adverse drainage impact to the existing channel embankment along the west edge of the site. The new curb and gutter will collect developed drainage along the west edge of the storage yard and direct developed flows south to a new concrete curb chase flowing into the existing curb and gutter at the northwest corner of the Venture Street cul-de-sac.

The limit of disturbance for the proposed Storage Yard within Basin F has been identified as 0.98-acres. As noted on Figure D1, previously disturbed areas beyond the perimeter of the proposed Storage Yard are excluded from permanent water quality requirements based on ECM Appendix I.6.1.B.7 (Sites with Land Disturbance to Undeveloped Land that Will Remain Undeveloped). Previously disturbed areas beyond the Storage Yard will be restored to meadow and landscaping.

Although flows are less than what was originally calculated, channel stability still needs to be addressed in this report especially if the previously depicted channel improvements were not completed.

As noted on the enclosed Developed Drainage Plan (Figure D1), the proposed development has a calculated impervious area of 56.9 percent, which is significantly lower than the impervious percentage of 90 percent that was assumed in the previously approved subdivision drainage report.

Recognizing that the calculated flows are lower than the flows calculated in the previously approved subdivision drainage report, the existing downstream drainage system and drainage channel provide a suitable outfall for drainage from this site.

Hydrologic calculations for the site are detailed in Appendix B, and peak flows are identified on Figures EX1 and D1 (Appendix C).

III. DRAINAGE PLANNING FOUR STEP PROCESS

El Paso County Drainage Criteria require drainage planning to include a Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainageways, and implementing long-term source controls. The Four Step Process has been implemented as follows in the planning of this project:

Step 1: Employ Runoff Reduction Practices

- Minimize Impacts: The proposed site development consists of a paved Storage Yard on a platted infill lot which has been previously planned for full heavy industrial development. This infill project will have minimal drainage impacts in comparison to new development of an unplatted site.

Step 2: Stabilize Drainageways

- The existing East Fork Sand Creek drainage channel adjoining the west boundary of this site was improved and stabilized during initial development of the subdivision. The completed drainage channel improvements are documented in the subdivision drainage report.

Step 3: Provide Water Quality Capture Volume (WQCV)

- This site is excluded from permanent Water Quality control measure requirements based on the non-excluded disturbed area remaining under one acre.

Step 4: Consider Need for Industrial and Commercial BMPs

- The Owner is responsible for maintaining proper housekeeping practices and spill containment procedures.

Thank you for including this information about the floodplain and the elevations. Please see comment on the SDP and contact the regional floodplain administrator regarding this application and include any additional relevant information for this section in the next submittal.

IV. FLOODPLAIN IMPACTS

Floodplain limits in vicinity of this site are delineated in the applicable Flood Insurance Rate Map, FIRM Panel No. 08041C0756G dated December 7, 2018 (FIRM exhibit enclosed in Appendix C). The west edge of this site is impacted by the delineated 100-year FEMA floodplain limits of the adjoining East Fork Sand Creek channel.

The existing fence along the west edge of the developed part of the site is located east of the delineated 100-year floodplain, and no site disturbance is proposed within the 100-year floodplain limits.

The FEMA map identifies a maximum 100-year water surface elevation of 6413.0 in vicinity of the northwest corner of this property. The existing ground elevation in the northwest corner of the fenced area of the site is approximately 6418.0 (5 feet above the 100-year flood elevation).

V. STORMWATER DETENTION AND WATER QUALITY

No stormwater detention is required based on the previous drainage planning for this subdivision having accounted for developed impervious areas higher than the currently proposed site development.

Areas Excluded from Water Quality Facilities

As previously discussed, previously disturbed areas beyond the perimeter of the proposed Storage Yard are excluded from permanent water quality requirements based on ECM Appendix I.6.1.B.7 (Sites with Land Disturbance to Undeveloped Land that Will Remain Undeveloped). The previously disturbed perimeter areas will be restored to meadow or landscaping and remain undeveloped in accordance with this exclusion. As tabulated on Figure D1 (and Appendix C), the total disturbed area is 1.22 acres, and the excluded area if 0.24 acres.

The total limit of disturbance (LOD) of the remaining non-excluded area of the project site is 0.98-acres, which is less than the allowable 1-acre of total site area not requiring water quality treatment.

VI. DRAINAGE BASIN FEES

The site lies within the Sand Creek Drainage Basin. No public drainage improvements are required for development of this site. Required drainage fees have been paid during the previous subdivision platting process, so there are no applicable drainage fees required with the Site Development Plan.

Per the Plat, fees were deferred for channel improvements. Please reference Plat No. R11549 and update this section as needed.

VII. SUMMARY

The developed drainage patterns associated with the proposed Storage Yard at 7720 Venture Street (Lot 2, Marksheffel Business Center Filing No. 1) will remain consistent with the established drainage conditions for this subdivision. The existing stormwater outfalls are functioning properly, including the existing grouted riprap channel flowing westerly from the Venture Street cul-de-sac into the adjoining East Fork Sand Creek channel. Proper establishment and maintenance of positive drainage within the site, in conjunction with proper erosion control practices, will ensure that this developed site has no ~~significant~~ adverse impact on downstream or surrounding areas.

This should be a definitive statement and so please remove this word.

APPENDIX A

EXCERPTS FROM SUBDIVISION DRAINAGE REPORT

FINAL DRAINAGE REPORT AND PLAN

MARKSHEFFEL BUSINESS CENTER FILING NO. 1

DBC Project No. C7587-1

Prepared for:

Marksheffel Business Center, LLC
6040 N. 22nd Place
Phoenix, AZ 85016

Prepared by:

Drexel, Barrell & Co.
6365 Corporate Drive
Colorado Springs, CO 80919
719/260-0887

November, 2002
Revised April, 2003
Revised July, 2003
Revised August, 2003
Revised September, 2003

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REACH NO. 6

BACK POCKET

DRAINAGE PLAN

ENGINEER'S STATEMENT

Final Drainage Report and Plan
Marksheffel Business Center Filing No. 1
DBC Project No. C7587-1

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 City / 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.

Clifford R. Brockman, P.E. #22117 — Date: 9/5/03

Owner's Statement

I, the Owner, have read and will comply with all the requirements specified in the drainage report and plan.

Marksheffel Business Center LLC — Business Name — Date: 9/15/03

By

Manager — Title

6040 N 22nd Place — Address

Phoenix AZ 85016

County of El Paso

Filed in accordance with Section 51.1 of the El Paso County Land Development Code, as amended.

John A. McCarty — County Engineer/Director — Date: 9-18-03

Conditions:

1.0 INTRODUCTION

Marksheffel Business Center Filing No. 1 is a proposed 15.67 acre Industrial and Development located in El Paso County. The zoning for this property is Heavy Industrial Development (PHID). The project is located approximately 1 mile north of State Highway #24. The project is bordered on the north by Palmer Park Boulevard, vacant land on the west, Homestake Nurseries (Ban L.L.C.) on the south and Marksheffel Road on the east. The site is located in Section 5, T14 S, R65 W, of the 6th Principal Meridian. A vicinity map of the project is provided in Appendix A.

The above referenced project will be developed into an industrial park. On site improvements are to include roadway construction and various drainage improvements. Roadways are to be constructed to a centerline crown section with Type 1 curb and gutter to convey storm water runoff. Also as a part of this development, a portion of Reach No.6 of the East Fork of Sand Creek will be improved. A CLOMR/LOMR will be submitted to FEMA for construction approval.

The site slopes range from 1%-3% from the north to the south. Onsite vegetation consists of natural grasses. Onsite soils consist of Blakeland (#8). This soil type belongs to the "A" hydrologic group, which is typical well drained with high erosion potential. These soils are typically also moderately to well drained with medium erosive qualities. All hydrologic analysis was performed based on soils be in the "A" hydrologic grouping.

2.0 DRAINAGE DESIGN CRITERIA

This report was prepared in accordance with the criteria presented in the City of Colorado Springs / El Paso County Drainage Criteria Manual. The Rational Method was used to size onsite drainage facilities. Onsite basin boundaries were determined from site topography that was provided by the owner. Both the minor (10-year) and major (100-year) storms were evaluated for this report. The runoff amounts determined for both of these storm events were used to design onsite drainage facilities. This report conforms to the Sand Creek Drainage Basin Planning Study (DBPS) prepared by Kiowa Engineering Corporation dated July 1996 and the Master Development Drainage Plan and Preliminary Drainage Report and Plan prepared by Drexel, Barrell & Co. dated August 2002.

3.0 EXISTING HYDROLOGICAL CONDITIONS

The project site is located in the Sand Creek Drainage Basin and is tributary to Reach No. 6 of the East Fork of Sand Creek analyzed in the planning study by Kiowa Engineering. This site is drained via an ill-defined natural channel called Reach No. 6 in the Kiowa Study and traverses the site along the western side flowing in a southerly direction. Drainage from this site sheet flows over natural vegetation in a meandering fashion and enters the shallow channel and flows south eventually to the East Fork of Sand Creek. Offsite runoff north of Palmer Park Boulevard (1380 cfs) combines with on-site runoff for a total of 1380 cfs in the 100-year storm event per the Kiowa Study.

Basin E1

Basin E1 consists of on-site runoff from this development and runoff from Marksheffel Road. Runoff sheet flows overland to the southwest onto the adjacent landowner to the south. Runoff is calculated to be 3.7 cfs and 7.2 cfs for the 10 and 100-year storms.

Developed runoff south onto the adjacent landowner will be restricted to sheet flow in amounts not to exceed existing for future development. An temporary berm will be constructed on the southern boundary of this development to restrict developed flow to historic amounts. Subsequent plot plans in this basin will need to conform to this criteria.

Basin E2
Basin E2 consists of on-site runoff from this development. Runoff sheet flows overland to the southwest to Reach No. 6 of the East Fork of Sand Creek. Runoff is calculated to be 9.6 cfs and 19.5 cfs for the 10 and 100-year storms at Design Point No. 1.

Basin OS-1
Basin OS-1 consists of off-site runoff from the adjacent land owner to the north and from a portion of Marksheffel Road. Runoff sheet flows overland to the southwest onto this development. Runoff is calculated to be 1.0 cfs and 1.8 cfs for the 10 and 100-year storms at Design Point No. 2. Runoff from this basin will be redirected to the west in the Palmer Park Boulevard ROW via a shallow swale so it does not enter this development.

4.0 DEVELOPED HYDROLOGICAL CONDITIONS

The proposed development is delineated into six minor basins to analyze drainage characteristics at critical areas. All of the basins are shown on the "Developed Conditions Drainage Map" provided in the back pocket of this report. The developed runoff for each minor basin is calculated for the 10-year and 100-year design storms using the Rational Method. In addition, flows at critical design points are presented on the runoff summary table in Appendix C. Supporting hydrology and hydraulic calculations are provided in Appendix B and C.

The general concept of conveying runoff from the 10-year storm event is to maximize runoff to the street from Basins A & B (spread limited to 20' from flowline, Table 6-1 in the DCM) and collecting the runoff at the west end of Venture Street. The general concept of conveying runoff from the 100-year storm event for Basins A & B is to utilize the entire ROW (depth limited to 12", Table 6-1 in the DCM). The drainage patterns of the remaining minor basins allows runoff from the 10-year and 100-year storm event to flow overland (parking lots) southwest to the proposed Reach No. 6 channel. Construction of storm sewer for the 100-year runoff is unnecessary due to the significant capacity of the streets and parking lots to accommodate the runoff (See Appendix C).

Flow concepts for each of the minor basins are briefly discussed as follows:

Basin A
Approximately 2/3 of the runoff from Basin A flows southwesterly through Lot No. 1 via curb and gutter and overland parking lot flow. This flow is collected by curb and gutter on Venture Street and is directed west. The balance of the runoff from this basin is from Venture Street and on the future expansion of Marksheffel Road. All runoff for the 10-year storm event is conveyed to a single 10' curb opening (Design Point 1) located at the west end of Venture Street in the cul-de-sac. The opening outlets into a drainage swale flowing west to Reach No. 6. The swale is designed for the 100-year storm event. The estimated runoff from the 10-year and 100-year storms is 14.7 cfs and 24.5 cfs respectively. Runoff from the 100-year storm will overtop the curb in the cul-de-sac and flow west via a swale to Reach No. 6. See Appendix C

Basin B

Runoff from Basin B is from the south portion of Venture Street. This runoff flows west via curb and gutter on Venture Street to a curb opening (Design Point 1 previously discussed in Basin A) located at the west end of Venture Street in the cul-de-sac. The estimated runoffs from the 10-year and 100-year storms are 2.9 cfs and 4.7 cfs respectively from this basin. See Basin A for discussion of the 100-year overflow swale for this basin.

Basin C

Runoff from Basin C is from the future expansion of Marksheffel Road. This runoff will flow to Design Point 2, then south to the future Woodpark Drive in a roadside ditch constructed as part of the future expansion of Marksheffel Road. Until the expansion occurs, a portion of the runoff from the existing Marksheffel Road will flow overland into Basin D. The estimated developed runoff from the 10-year and 100-year storms are 6.2 cfs and 9.9 cfs respectively.

Basin D

Runoff from Basin D is from Lot 4 and a portion of Lot 3. This flow will conveyed overland via parking lots or storm sewer to Design Point 3 (Reach No. 6). Rip rap or other erosion protection measures will be required to discharge into Reach No.6 to mitigate channel bank erosion when the plot plan for lots in this basin are submitted for approval. The estimated runoffs from the 10-year and 100-year storms are 22.8 cfs and 38.6 cfs respectively.

Basin E & F

Runoff from Basins E & F is from Lots 1, 2 & 3. This runoff is conveyed overland via parking lots or storm sewer southwesterly throughout the basins. Developed flows from this basin will need to be discharged into Reach No.6 via an inlet or rip rap ditch to mitigate channel bank erosion. The estimated runoff from Basin E for the 10-year and 100-year storms is13.8 cfs and 23.4 cfs respectively; for Basin F the runoff for the 10-year and 100-year storms are 7.5 cfs and 13.1 cfs respectively.

5.0 STORMWATER MANAGEMENT AND EROSION CONTROL

As discussed above, two of the minor basins (A and B) will be routed to Venture Street for this development. This roadway has the carrying capacity to contain the 10-year minor design without exceeding criteria (Table 6-1 in DCM) and to fully contain the 100-year major design without overflowing the 80-foot ROW with a maximum depth of 12 inches at the flowline of the curb. A hydraulic street capacity analysis is provided in Appendix C.

The curb opening at the west end of Venture Street is sized to accept the 10-year minor storm without overtopping the curb and limiting the spread to less that 20-feet from the curb flowline. Runoff in excess of the curb opening capacity will be conveyed via an emergency overflow swale west to Reach No. 6. Erosion control measures will be implemented to prevent erosion in the swale.

Runoff from Basins C and D will flow to a swale located at the southern boundary of this development. This swale will be designed to accept flow from the 100-year storm event

and will flow west to Reach No. 6. An erosion control blanket will be placed and planted to prevent erosion in the swale.

During construction, adverse impacts on runoff water quality will be mitigated through the implementation of temporary erosion controls and best management practices. Temporary erosion control measures shall include the installation of perimeter silt fencing to prevent migration of disturbed soils, inlet protection to prevent sedimentation of the proposed storm sewer and vehicle tracking control at the construction site entrances.

6.0 REACH NO. 6 OF THE EAST FORK OF SAND CREEK

Reach No. 6 of East Fork Sand Creek from the northern property line south to the future Woodpark Drive is proposed to be improved in accordance with the recommendations made by Kiowa Engineering in the DBPS for Sand Creek. Improvements include the construction of a new 100-Year riprap channel, installing at least two drop structures. The channel will be located within a drainage easement of sufficient width granted to El Paso County. Marksheffel Business Center, LLC is currently designing Reach No. 6 and intends to submit a CLOMR/LOMR application for these improvements. It is anticipated that the new 100-year floodplain will be contained within the banks of Reach No. 6 channel.

7.0 DRAINAGE AND BRIDGE FEES

Current El Paso County Subdivision Regulations require drainage and bridge fees to be paid for platting of land in accordance with Resolution No. 03-34. Drainage fees for the Sand Creek Drainage Basin are $15,000 per impervious acre and bridge fees of $1,336 per impervious acre. The site acreage for Marksheffel Business Center Filing No. 1 is 15.67 acres with 1.85 acres of land dedicated for Marksheffel Road ROW and 1.01 acres located within Reach No. 6 which results in 12.81 acres subject to drainage and bridge fees. The fees are as follows:

- Drainage Fees: $15,000 per acre x 12.81 acres x 90% impervious = **$172,935.00**

- Bridge Fees: $1,336 x 12.81 acres x 90% impervious = **$15,415.00**

The owner intends to construct Reach No. 6 channel improvements from the north property line southerly to the future Woodpark Drive. The estimated construction costs are eligible for compensation and will be deducted from the drainage fees.

Reimbursable Costs for Reach No. 6

Item	Units	Cost/Unit	Total
Reach 6 Improvements	1 EA	$172,910/EA	$172,910
Engineering	1 EA	$17,000/EA	$17,000
		Total	$189,910

8.0 CONCLUSIONS

This drainage report has been prepared in accordance with City of Colorado Springs/El Paso County Drainage Criteria Manual. The proposed development will not cause any adverse impacts to adjacent properties or properties located downstream. Several aspects of the development have been discussed above and are summarized below:

- Developed storm water runoff will be conveyed via street curb and gutter to Reach No. 6 or overland via parking lots to Reach No. 6.
- During construction, erosion control measures will be installed to prevent migration of on-site soils to neighboring properties and Reach No. 6.

DREXEL BARRELL & Co.
Engineers - Surveyors
FAX 719-260-8352
PHONE 719-260-0887

PROJECT NAME: Marksheffel Business Center
PROJECT NUMBER: C7587-1
DATE: 17-Dec-02
CALCULATED BY: DMM

BASIN RUNOFF COEFFICIENTS

Basin A (3.50 Acres):

Developed				Composite Values		
Classification	Acreage	10 Year	100 Year		$C_{10}A$	$C_{100}A$
Roads	1.35	0.90	0.95		1.22	1.28
Heavy Industrial	2.15	0.80	0.90		1.72	1.94
TOTALS	3.50				2.94	3.22
WEIGHTED RUNOFF COEFFICIENTS		0.84	0.92			

Basin B (0.55 Acres)

Developed				Composite Values		
Classification	Acreage	10 Year	100 Year		$C_{10}A$	$C_{100}A$
Roads	0.39	0.90	0.95		0.35	0.37
Heavy Industrial	0.16	0.80	0.90		0.13	0.14
TOTALS	0.55				0.48	0.51
WEIGHTED RUNOFF COEFFICIENTS		0.87	0.94			

Basin C (1.37 Acres)

Developed				Composite Values		
Classification	Acreage	10 Year	100 Year		$C_{10}A$	$C_{100}A$
Roads	1.37	0.90	0.95		1.23	1.30
TOTALS	1.37				1.23	1.30
WEIGHTED RUNOFF COEFFICIENTS		0.90	0.95			

Basin D (6.13 Acres)

Developed				Composite Values		
Classification	Acreage	10 Year	100 Year		$C_{10}A$	$C_{100}A$
Heavy Industrial	6.13	0.80	0.90		4.90	5.52
TOTALS	6.13				4.90	5.52
WEIGHTED RUNOFF COEFFICIENTS		0.80	0.90			

Basin E (3.29 Acres)

Developed				Composite Values		
Classification	Acreage	10 Year	100 Year		$C_{10}A$	$C_{100}A$
Heavy Industrial	3.29	0.80	0.90		2.63	2.96
TOTALS	3.29				2.63	2.96
WEIGHTED RUNOFF COEFFICIENTS		0.80	0.90			

Basin F (1.71 Acres)

Developed				Composite Values		
Classification	Acreage	10 Year	100 Year		$C_{10}A$	$C_{100}A$
Heavy Industrial	3.29	0.80	0.90		2.63	2.96
TOTALS	3.29				2.63	2.96
WEIGHTED RUNOFF COEFFICIENTS		0.80	0.90			

DEVELOPED CONDITIONS
HYDROLOGY CALCULATIONS

BASIN	CRITERIA REFERENCE[1]	A	B	C	D	E	F
AREA, A [ACRE]	-	3.50	0.55	1.37	6.13	3.29	1.71
RUN-OFF COEFFICIENT, C_{10}		0.84	0.87	0.90	0.80	0.80	0.80
OVERLAND FLOW LENGTH, L_O [FT]	-	100.00	0.00	100.00	150.00	150.00	150.00
OVERLAND SLOPE, S_O [%]	-	1.00	1.00	1.00	1.33	2.00	2.00
OVERLAND FLOW TIME, t_i [MIN]	-	4.68	0.00	3.60	6.01	5.25	5.25
TRAVEL FLOW LENGTH, Lt [FT]	-	600.00	530.00	620.00	780.00	300.00	165.00
TRAVEL SLOPE, S_t [%]	-	2.50	1.50	1.70	2.50	2.50	2.50
TRAVEL VELOCITY, V_t [FT/SEC]	FIGURE RO-1[2]	3.20	2.40	2.50	3.20	3.20	3.20
TRAVEL TIME, t_t [MIN]	-	3.13	3.68	4.13	4.06	1.56	0.86
TIME OF CONCENTRATION, t_c	t_i+t_t	7.81	3.68	7.73	10.08	6.81	6.11
10-YR RUN-OFF COEFFICIENT, C_{10}		0.84	0.87	0.90	0.80	0.80	0.80
10-YR RAINFALL INTENSITY, I_{10} [IN/HR]	-	5.00	6.00	5.00	4.65	5.25	5.50
10-YR MAXIMUM RUN-OFF, Q_{10} [CFS]	Q=CIA	14.70	2.87	6.17	22.80	13.82	7.52
100-YR RUN-OFF COEFFICIENT, C_{100}		0.92	0.94	0.95	0.90	0.90	0.90
100-YR RAINFALL INTENSITY, I_{100} [IN/HR]	-	7.60	9.00	7.60	7.00	7.90	8.50
100-YR MAXIMUM RUN-OFF, Q_{100} [CFS]	Q=CIA	24.47	4.65	9.89	38.62	23.39	13.08

[1] *City of Colorado Springs and El Paso County Drainage Criteria Manual* unless otherwise noted.
[2] *Urban Drainage Criteria Manual*

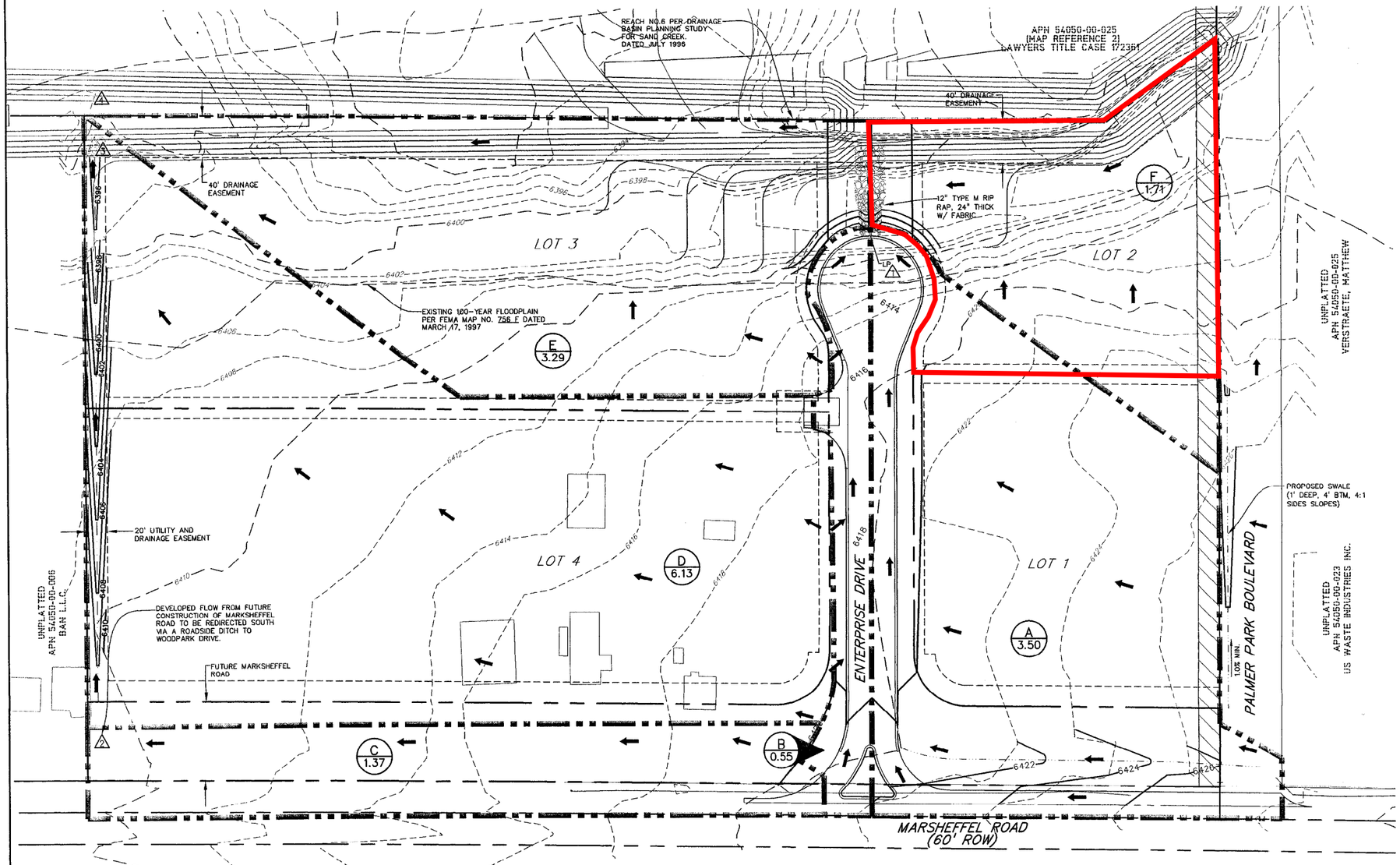
TABLE 5-1

RECOMMENDED AVERAGE RUNOFF COEFFICIENTS AND PERCENT IMPERVIOUS

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS	"C" FREQUENCY 10 A&B*	10 C&D*	100 A&B*	100 C&D*
Business					
Commercial Areas	95	0.90	0.90	0.90	0.90
Neighborhood Areas	70	0.75	0.75	0.80	0.80
Residential					
1/8 Acre or less	65	0.60	0.70	0.70	0.80
1/4 Acre	40	0.50	0.60	0.60	0.70
1/3 Acre	30	0.40	0.50	0.55	0.60
1/2 Acre	25	0.35	0.45	0.45	0.55
1 Acre	20	0.30	0.40	0.40	0.50
Industrial					
Light Areas	80	0.70	0.70	0.80	0.80
Heavy Areas	90	0.80	0.80	0.90	0.90
Parks and Cemeteries	7	0.30	0.35	0.55	0.60
Playgrounds	13	0.30	0.35	0.60	0.65
Railroad Yard Areas	40	0.50	0.55	0.60	0.65
Undeveloped Areas					
Historic Flow Analysis- Greenbelts, Agricultural	2	0.15	0.25	0.20	0.30
Pasture/Meadow	0	0.25	0.30	0.35	0.45
Forest	0	0.10	0.15	0.15	0.20
Exposed Rock	100	0.90	0.90	0.95	0.95
Offsite Flow Analysis (when land use not defined)	45	0.55	0.60	0.65	0.70
Streets					
Paved	100	0.90	0.90	0.95	0.95
Gravel	80	0.80	0.80	0.85	0.85
Drive and Walks	100	0.90	0.90	0.95	0.95
Roofs	90	0.90	0.90	0.95	0.95
Lawns	0	0.25	0.30	0.35	0.45

* Hydrologic Soil Group

9/30/90



RUNOFF SUMMARY TABLE

BASIN	DRAINAGE AREA (ACRES)	RUNOFF 10 YR (cfs)	RUNOFF 100 YR (cfs)
A	3.50	14.7	24.5
B	0.55	2.9	4.7
C	1.37	6.2	9.9
D	6.13	22.8	38.6
E	3.29	13.8	23.4
F	1.71	7.5	13.1

RUNOFF SUMMARY TABLE

DESIGN POINT	RUNOFF 10 YR (cfs)	RUNOFF 100 YR (cfs)
1	17.1	28.3
2	6.2	9.9
3	22.8	38.6
4	X	1380

PREPARED BY: Drexel Barrell & Co. Engineers Surveyors
6385 CORPORATE DRIVE COLORADO SPRINGS, COLORADO 80919 (719) 260-0887
4840 PEARL EAST CIRCLE, SUITE 114 BOULDER, COLORADO 80301 (303) 442-4338
5401 W. 10TH STREET, SUITE 100A GREELEY, COLORADO 80634 (970) 351-0645
CONTACT: RICHARD L. SCHINDLER

PREPARED FOR: WILSHIRE DEVELOPMENT CORP
6040 N. 22ND PLACE
PHOENIX, AZ 85016
(602) 957-0966
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PROJECT INFO: MARKSHEFFEL BUSINESS CENTER
MARKSHEFFEL AND PALMER PARK
COLORADO SPRINGS, COLORADO

DESIGNED BY: DMM
DRAWN BY: ARE
CHECKED BY: RLS

REVISION DESCRIPTIONS DATE

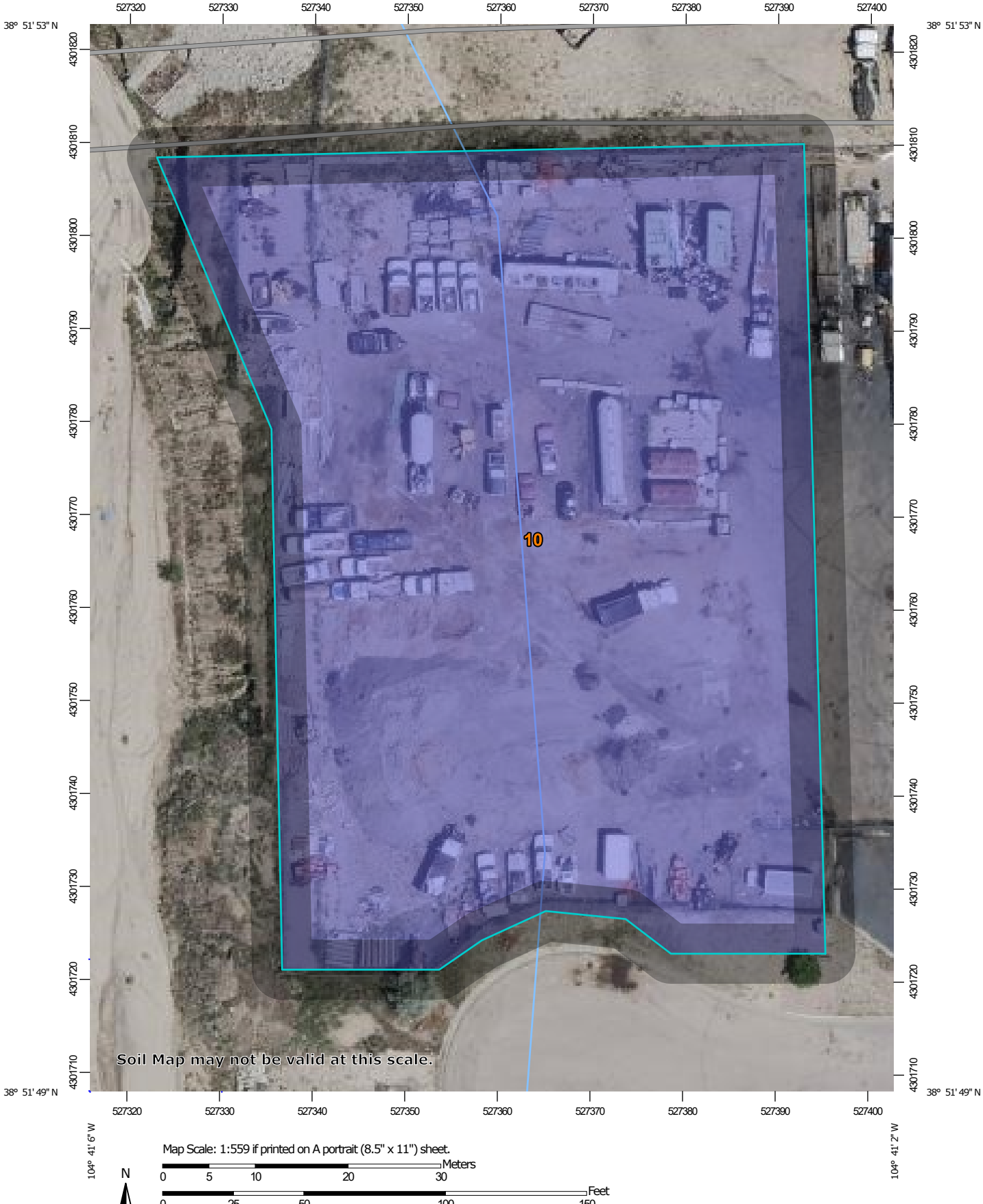
DRAWING INFO: DEVELOPED CONDITIONS DRAINAGE MAP

DATE: 08 NOV 2002
JOB NO: C7587-1
SHEET 1
SCALE: H. 1"=50' V. N/A
DRAWING NO.: 5D 948
SHEETS 1

APPENDIX B

DRAINAGE CALCULATIONS

Hydrologic Soil Group—El Paso County Area, Colorado
(7720 Venture Street)



Map Scale: 1:559 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 5 10 20 30

Feet
0 25 50 100 150

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

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: El Paso County Area, Colorado
Survey Area Data: Version 23, Aug 29, 2025

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

Date(s) aerial images were photographed: Jul 23, 2024—Aug 4, 2024

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
10	Blendon sandy loam, 0 to 3 percent slopes	B	1.3	100.0%
Totals for Area of Interest			**1.3**	**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

Table 6-6. Runoff Coefficients for Rational Method
(Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
1/8 Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
1/4 Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
1/3 Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
1/2 Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													
Historic Flow Analysis--Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

3.2 Time of Concentration

One of the basic assumptions underlying the Rational Method is that runoff is a function of the average rainfall rate during the time required for water to flow from the hydraulically most remote part of the drainage area under consideration to the design point. However, in practice, the time of concentration can be an empirical value that results in reasonable and acceptable peak flow calculations.

For urban areas, the time of concentration (t_c) consists of an initial time or overland flow time (t_i) plus the travel time (t_t) in the storm sewer, paved gutter, roadside drainage ditch, or drainage channel. For non-urban areas, the time of concentration consists of an overland flow time (t_i) plus the time of travel in a concentrated form, such as a swale or drainageway. The travel portion (t_t) of the time of concentration can be estimated from the hydraulic properties of the storm sewer, gutter, swale, ditch, or drainageway. Initial time, on the other hand, will vary with surface slope, depression storage, surface cover, antecedent rainfall, and infiltration capacity of the soil, as well as distance of surface flow. The time of concentration is represented by Equation 6-7 for both urban and non-urban areas.

$$t_c = t_i + t_t \quad \text{(Eq. 6-7)}$$

Where:

t_c = time of concentration (min)

t_i = overland (initial) flow time (min)

t_t = travel time in the ditch, channel, gutter, storm sewer, etc. (min)

3.2.1 Overland (Initial) Flow Time

The overland flow time, t_i, may be calculated using Equation 6-8.

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}} \quad \text{(Eq. 6-8)}$$

Where:

t_i = overland (initial) flow time (min)
C_5 = runoff coefficient for 5-year frequency (see Table 6-6)
L = length of overland flow (300 ft maximum for non-urban land uses, 100 ft maximum for urban land uses)
S = average basin slope (ft/ft)

Note that in some urban watersheds, the overland flow time may be very small because flows quickly concentrate and channelize.

3.2.2 Travel Time

For catchments with overland and channelized flow, the time of concentration needs to be considered in combination with the travel time, t_t, which is calculated using the hydraulic properties of the swale, ditch, or channel. For preliminary work, the overland travel time, t_t, can be estimated with the help of Figure 6-25 or Equation 6-9 (Guo 1999).

$$V = C_v S_w^{0.5} \quad \text{(Eq. 6-9)}$$

Where:

V = velocity (ft/s)

C_v = conveyance coefficient (from Table 6-7)

S_w = watercourse slope (ft/ft)

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

* For buried riprap, select C_v value based on type of vegetative cover.

The travel time is calculated by dividing the flow distance (in feet) by the velocity calculated using Equation 6-9 and converting units to minutes.

The time of concentration (t_c) is then the sum of the overland flow time (t_i) and the travel time (t_t) per Equation 6-7.

3.2.3 First Design Point Time of Concentration in Urban Catchments

Using this procedure, the time of concentration at the first design point (typically the first inlet in the system) in an urbanized catchment should not exceed the time of concentration calculated using Equation 6-10. The first design point is defined as the point where runoff first enters the storm sewer system.

$$t_c = \frac{L}{180} + 10 \qquad \text{(Eq. 6-10)}$$

Where:

t_c = maximum time of concentration at the first design point in an urban watershed (min)

L = waterway length (ft)

Equation 6-10 was developed using the rainfall-runoff data collected in the Denver region and, in essence, represents regional "calibration" of the Rational Method. Normally, Equation 6-10 will result in a lesser time of concentration at the first design point and will govern in an urbanized watershed. For subsequent design points, the time of concentration is calculated by accumulating the travel times in downstream drainageway reaches.

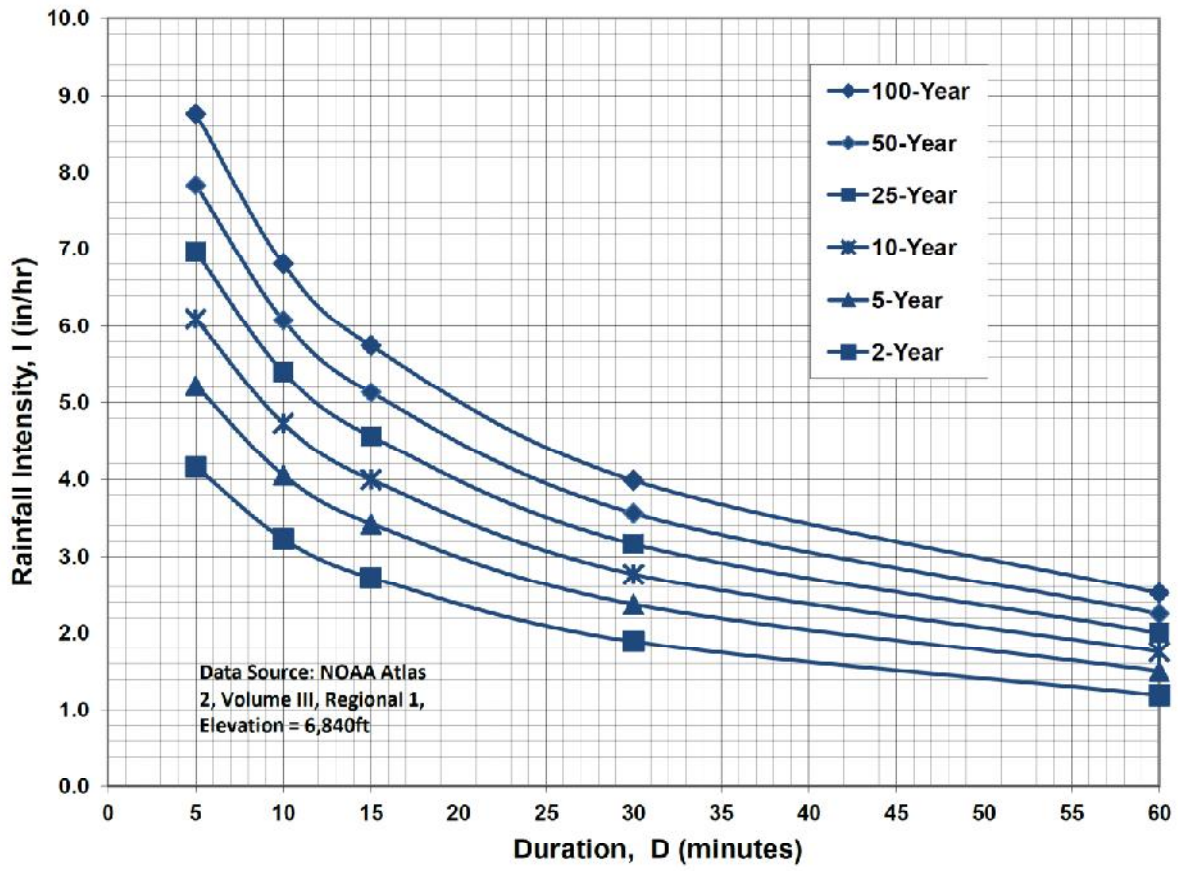
3.2.4 Minimum Time of Concentration

If the calculations result in a t_c of less than 10 minutes for undeveloped conditions, it is recommended that a minimum value of 10 minutes be used. The minimum t_c for urbanized areas is 5 minutes.

3.2.5 Post-Development Time of Concentration

As Equation 6-8 indicates, the time of concentration is a function of the 5-year runoff coefficient for a drainage basin. Typically, higher levels of imperviousness (higher 5-year runoff coefficients) correspond to shorter times of concentration, and lower levels of imperviousness correspond to longer times of

Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



IDF Equations

$I_{100} = -2.52 \ln(D) + 12.735$

$I_{50} = -2.25 \ln(D) + 11.375$

$I_{25} = -2.00 \ln(D) + 10.111$

$I_{10} = -1.75 \ln(D) + 8.847$

$I_{5} = -1.50 \ln(D) + 7.583$

$I_{2} = -1.19 \ln(D) + 6.035$

Note: Values calculated by equations may not precisely duplicate values read from figure.

7720 VENTURE STREET
COMPOSITE RUNOFF COEFFICIENTS

DEVELOPED CONDITIONS

5-YEAR C-VALUES

BASIN	TOTAL AREA (AC)	AREA (AC)	SUB-AREA 1 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 3 DEVELOPMENT/ COVER	C	WEIGHTED C VALUE
F	1.66	0.945	ASPHALT / PAVEMENT	0.9	0.00	GRAVEL	0.59	0.72	LANDSCAPED	0.08	0.512

100-YEAR C-VALUES

BASIN	TOTAL AREA (AC)	AREA (AC)	SUB-AREA 1 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	C	AREA (AC)	SUB-AREA 3 DEVELOPMENT/ COVER	C	WEIGHTED C VALUE
F	1.66	0.945	ASPHALT / PAVEMENT	0.96	0.00	GRAVEL	0.7	0.72	LANDSCAPED	0.35	0.547

IMPERVIOUS AREAS

BASIN	TOTAL AREA (AC)	AREA (AC)	SUB-AREA 1 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	AREA (AC)	SUB-AREA 3 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	WEIGHTED PERCENT MPERVIOUS
F	1.66	0.945	ASPHALT / PAVEMENT	100	0.00	GRAVEL	80	0.72	LANDSCAPED	0	56.928

7720 VENTURE STREET - STORAGE YARD

EXISTING CONDITION FLOWS

					Overland Flow			Channel flow										
BASIN	DESIGN POINT	AREA (AC)	C 5-YEAR	C 100-YEAR	LENGTH (FT)	SLOPE (FT/FT)	Tco [1] (MIN)	CHANNEL LENGTH (FT)	CONVEYANCE COEFFICIENT C	SLOPE (FT/FT)	SCS [2] VELOCITY (FT/S)	Tt [3] (MIN)	TOTAL Tc [4] (MIN)	TOTAL Tc [4] (MIN)	INTENSITY [5] 5-YR (IN/HR)	INTENSITY [5] 100-YR (IN/HR)	PEAK FLOW Q5 [6] (CFS)	PEAK FLOW Q100 [6] (CFS)
F	F	1.66	0.080	0.350	100	0.020	14.8	275	15	0.036	2.85	1.6	16.4	16.4	3.38	5.68	0.45	3.30

DEVELOPED FLOWS

					Overland Flow			Channel flow										
BASIN	DESIGN POINT	AREA (AC)	C 5-YEAR	C 100-YEAR	LENGTH (FT)	SLOPE (FT/FT)	Tco [1] (MIN)	CHANNEL LENGTH (FT)	CONVEYANCE COEFFICIENT C	SLOPE (FT/FT)	SCS [2] VELOCITY (FT/S)	Tt [3] (MIN)	TOTAL Tc [4] (MIN)	TOTAL Tc [4] (MIN)	INTENSITY [5] 5-YR (IN/HR)	INTENSITY [5] 100-YR (IN/HR)	PEAK FLOW Q5 [6] (CFS)	PEAK FLOW Q100 [6] (CFS)
F	F	1.66	0.512	0.547	100	0.020	8.5	275	20	0.036	3.79	1.2	9.8	9.8	4.17	7.00	3.54	6.35

1) OVERLAND FLOW Tco = (0.395*(1.1-RUNOFF COEFFICIENT)*(OVERLAND FLOW LENGTH^(0.5)/(SLOPE^(0.333))
2) SCS VELOCITY = C * ((SLOPE(FT/FT)^0.5)
   C = 2.5 FOR HEAVY MEADOW
   C = 5 FOR TILLAGE/FIELD
   C = 7 FOR SHORT PASTURE AND LAWNS
   C = 10 FOR NEARLY BARE GROUND
   C = 15 FOR GRASSED WATERWAY
   C = 20 FOR PAVED AREAS AND SHALLOW PAVED SWALES
3) MANNING'S CHANNEL TRAVEL TIME = L/V (WHEN CHANNEL VELOCITY IS KNOWN)
4) Tc = Tco + Tt
*** IF TOTAL TIME OF CONCENTRATION IS LESS THAN 5 MINUTES, THEN 5 MINUTES IS USED
5) INTENSITY BASED ON I-D-F EQUATIONS IN CITY OF COLORADO SPRINGS DRAINAGE CRITERIA MANUAL
   $I_5 = -1.5 * \ln(Tc) + 7.583$
   $I_{100} = -2.52 * \ln(Tc) + 12.735$
6) Q = CiA

Hydraulic Analysis Report

Project Data

Project Title: Project - 7720 Venture Street Storage Yard

Designer: JPS

Project Date: Thursday, September 10, 2026

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Channel Analysis - Curb Chase F

Notes:

Input Parameters

Channel Type: Rectangular

Channel Width: 2.0000 ft

Longitudinal Slope: 0.0200 ft/ft

Manning's n: 0.0130

Depth: 0.5000 ft

Result Parameters

Flow: 7.7716 cfs

Area of Flow: 1.0000 ft^2

Wetted Perimeter: 3.0000 ft

Hydraulic Radius: 0.3333 ft

Average Velocity: 7.7716 ft/s

Top Width: 2.0000 ft

Froude Number: 1.9369

Critical Depth: 0.7769 ft

Critical Velocity: 5.0016 ft/s

Critical Slope: 0.0058 ft/ft

Critical Top Width: 2.00 ft

Calculated Max Shear Stress: 0.6240 lb/ft^2

Calculated Avg Shear Stress: 0.4160 lb/ft^2

Water Quality Treatment Summary Table						
Basin ID(s)	**Total Tributary Basin Area (ac)**	**Total Disturbed Area (ac)**	**PCM Tributary Area (ac)**	**Excluded LOD Area (ac)**	**Non-Excluded LOD Area (ac)**	**PCM ID / Exclusion**
F	1.66	1.22		0.24	0.98	Excluded per ECM I.6.1.B.7
Total	**1.66**	**1.22**	**0**	**0.24**	**0.98**	

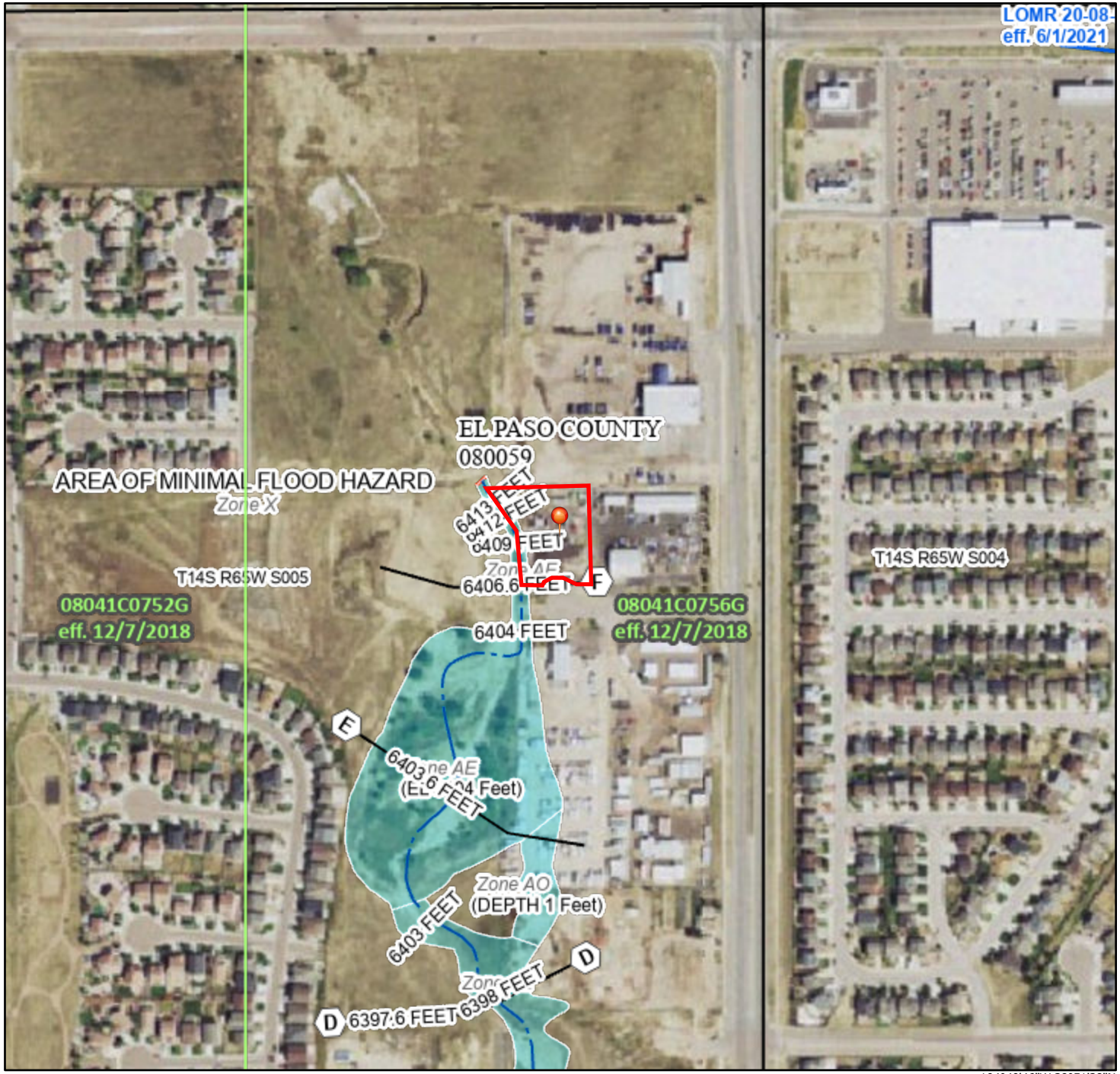
APPENDIX C

FIGURES

National Flood Hazard Layer FIRMette

FEMA

104°41'23"W 38°52'6"N



104°40'46"W 38°51'38"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 — Cross Sections with 1% Annual Chance
- 17.5 — Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

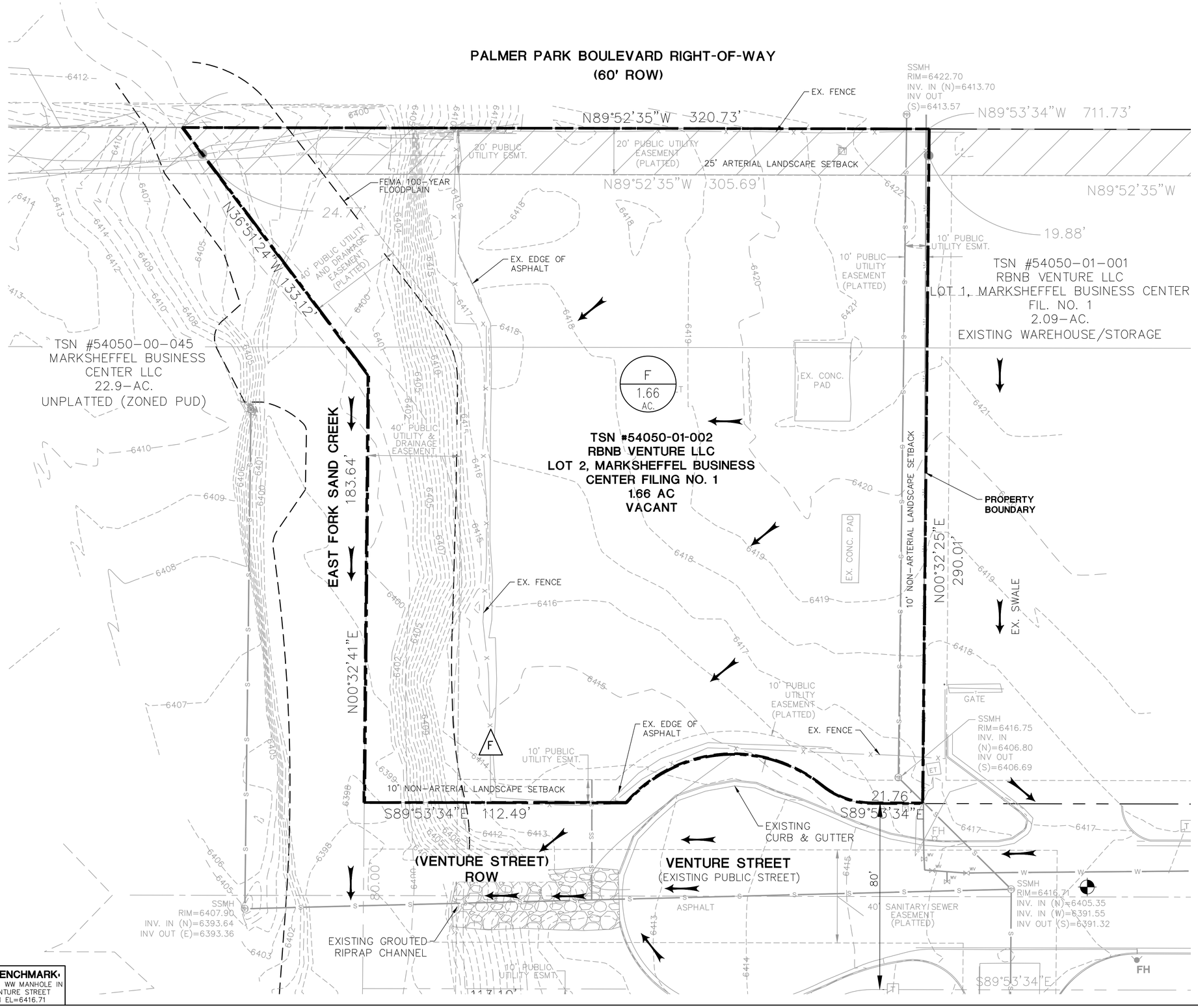
N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/14/2026 at 5:49 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



BENCHMARK:
EX. WW MANHOLE IN VENTURE STREET
RIM EL=6416.71

N

20' 0 20' 40'
ORIGINAL SCALE: 1"=20' (24"x36" SHEET)
CONTOUR INTERVAL: 1'

DRAINAGE PLAN LEGEND

- PROPERTY LINES
- DRAINAGE BASIN BOUNDARY
- 6424 PROPOSED CONTOUR
- 6424 EXISTING CONTOUR
- FEMA 100-YEAR FLOODWAY
- FEMA 100-YR FLOODPLAIN
- FLOWLINE
- FLOW DIRECTION ARROW
- PROPOSED STORM SEWER
- (E) EXISTING
- (P) PROPOSED
- 1 DESIGN POINT
- A / XX AC. BASIN DESIGNATION / BASIN AREA (ACRES)

BASIN SUMMARY TABLE

BASIN	Q5 (CFS)	Q100 (CFS)
F	0.5	3.3

HISTORIC SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
F	0.5	3.3

7720 VENTURE STREET - STORAGE YARD
LOT 2, MARKSHEFFEL BUSINESS CENTER FILING NO. 1

EXISTING CONDITIONS DRAINAGE PLAN

JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO
80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

No.	REVISION	BY	DATE
A			
B			
C			
D			
E			

HORZ. SCALE:	1"=20'
VERT. SCALE:	N/A
SURVEYED:	LDC
CREATED:	08/14/26
PROJECT NO:	072601
SHEET:	EX1
DRAWN:	PV
DESIGNED:	JPS
CHECKED:	JPS
LAST MODIFIED:	09/16/26
MODIFIED BY:	PV

PALMER PARK BOULEVARD RIGHT-OF-WAY
(60' ROW)

N89°52'35"W 320.73'

N89°53'34"W 711.73'

N89°52'35"W 305.69'

N89°52'35"W 3

EX. FENCE

PREVIOUSLY DISTURBED AREAS TO BE RESTORED TO HISTORIC CONDITIONS (0.24 ACRES) PER ECM EXCLUSION I.6.1.B.7

RESTORE ALL AREAS BEYOND PROPOSED EDGE OF ASPHALT TO UNDEVELOPED MEADOW/ LANDSCAPING

20' PUBLIC UTILITY EASEMENT (PLATTED)

20' PUBLIC UTILITY EASEMENT (PLATTED)

25' ARTERIAL LANDSCAPE SETBACK

FEMA 100-YEAR FLOODPLAIN

24.7'

N36°51'24"W 133.12'

40' PUBLIC UTILITY AND DRAINAGE EASEMENT (PLATTED)

18.5

22.0

1.1%

(P) EDGE OF ASPHALT (REMOVE EX. ASPHALT BEYOND)

TOTAL LIMIT OF DISTURBANCE (1.22 AC)

19.88'

10' PUBLIC UTILITY ESMT.

10' PUBLIC UTILITY EASEMENT (PLATTED)

(P) LIMIT OF NON-EXCLUDED DISTURBANCE (0.98 AC)

A

RESTORE ALL AREAS BEYOND PROPOSED EDGE OF ASPHALT TO UNDEVELOPED MEADOW/ LANDSCAPING

18.0

EX. EDGE OF ASPHALT

TSN #54050-00-045
MARKSHEFFEL BUSINESS CENTER LLC
22.9-AC.
UNPLATTED (ZONED PUD)

1.3%

F
1.66
AC.

ASPHALT

EX. CONC. PAD

30'

EXISTING PRIVATE ACCESS DRIVE CONNECTION

(P) TYPE 3 CURB & GUTTER (MATCH INTO EXISTING ASPHALT TO EAST) REMOVE ASPHALT TO WEST

TSN #54050-01-002
RBNB VENTURE LLC
LOT 2, MARKSHEFFEL BUSINESS CENTER FILING NO. 1
1.66 AC

TSN #54050-01-001
RBNB VENTURE LLC
LOT 1, MARKSHEFFEL BUSINESS CENTER FIL. NO. 1
2.09-AC.
EXISTING WAREHOUSE/STORAGE

40' PUBLIC UTILITY & DRAINAGE EASEMENT

PROTECT EX. FENCE

17.0

1.7%

EAST FORK SAND CREEK

183.64'

(P) EDGE OF ASPHALT (REMOVE EX. ASPHALT BEYOND)

EX. CONC. PAD

10' NON-ARTERIAL LANDSCAPE SETBACK

N00°32'25"E 290.01'

EX. FENCE

PROPOSED STORAGE YARD (EXISTING ASPHALT)

16.0

3.3%

EXISTING PRIVATE ACCESS DRIVE CONNECTION

30'

A

15.0

N00°32'41"E

10' PUBLIC UTILITY EASEMENT (PLATTED)

GATE

F

0.8%

(P) EDGE OF ASPHALT

(P) EDGE OF ASPHALT

SSMH
RIM=6416.75
INV. IN
(N)=6406.80
INV OUT
(S)=6406.69

10' PUBLIC UTILITY ESMT.

14.2

1.2%

13.8

A

EX. FENCE

EX. DRIVEWAY

EX. 6" PVC WATER MAIN

10' NON-ARTERIAL LANDSCAPE SETBACK

21.76

S89°53'34"E 112.49'

S89°53'34"E

EXISTING CURB & GUTTER

EX. EDGE OF ASPHALT

VENTURE STREET
(EXISTING PUBLIC STREET)

80.00'

ASPHALT

40' SANITARY SEWER EASEMENT (PLATTED)

SSMH
RIM=6407.90
INV. IN (N)=6393.64
INV OUT (E)=6393.36

SSMH
RIM=6416.71
INV. IN (N)=6405.35
INV. IN (W)=6391.55
INV OUT (S)=6391.32

B (P) 2'W CONCRETE CURB CHASE @ 2% MIN. SLOPE

MATCH INTO EX. CURB & GUTTER

EXISTING GROUTED RIPRAP CHANNEL

(E) 12" PVC WW MAIN

BENCHMARK:
EX. WW MANHOLE IN VENTURE STREET
RIM EL=6416.71

N
20' 0 20' 40'
ORIGINAL SCALE: 1"=20' (24"x36" SHEET)
CONTOUR INTERVAL: 1'

DRAINAGE PLAN LEGEND

- PROPERTY LINES
- DRAINAGE BASIN BOUNDARY
- 6424 PROPOSED CONTOUR
- 6424 EXISTING CONTOUR
- FEMA 100-YEAR FLOODWAY
- FEMA 100-YR FLOODPLAIN
- LOD LIMIT OF CONSTRUCTION/ DISTURBANCE
- FLOWLINE
- FLOW DIRECTION ARROW
- SD PROPOSED STORM SEWER
- (E) EXISTING
- (P) PROPOSED
- GRAVEL
- PREVIOUSLY DISTURBED AREAS TO BE RESTORED TO HISTORIC CONDITIONS (0.24 ACRES) PER ECM EXCLUSION I.6.1.B.7
- 1 DESIGN POINT
- A / XX AC BASIN DESIGNATION / BASIN AREA (ACRES)

BASIN SUMMARY TABLE

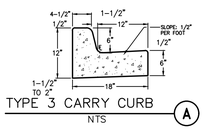
BASIN	Q5 (CFS)	Q100 (CFS)
F	3.5	6.4

DEVELOPED CONDITIONS SUMMARY HYDROLOGY TABLE

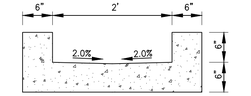
DESIGN POINT	Q5 (CFS)	Q100 (CFS)
F	3.5	6.4

IMPERVIOUS AREA CALCULATION
F BASIN AREA = 1.66 AC.

SURFACE TYPE	AREA
ASPHALT/CONCRETE PAVEMENT	41,172 SF
TOTAL IMPERVIOUS AREA	41,172 SF
	= 0.945 AC
	= 56.9%



TYPE 3 CARRY CURB (A)
NTS



CURB CHASE SECTION (B)
SCALE: 1"=1' H&V

Water Quality Treatment Summary Table						
Basin ID(s)	Total Tributary Basin Area (ac)	Total Disturbed Area (ac)	PCM Tributary Area (ac)	Excluded LOD Area (ac)	Non-Excluded LOD Area (ac)	PCM ID / Exclusion
F	1.66	1.22		0.24	0.98	Excluded per ECM I.6.1.B.7
Total	1.66	1.22	0	0.24	0.98	

7720 VENTURE STREET - STORAGE YARD
LOT 2, MARKSHEFFEL BUSINESS CENTER FILING NO. 1

DEVELOPED DRAINAGE PLAN

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No.	REVISION	BY	DATE

HORZ. SCALE:	1"=20'
VERT. SCALE:	N/A
SURVEYED:	LDC
CREATED:	08/14/26
PROJECT NO:	072601
DRAWN:	PV
DESIGNED:	EVELOPED
CHECKED:	JPS
LAST MODIFIED:	09/16/26
MODIFIED BY:	PV
SHEET:	D1