DRAINAGE COMPLIANCE LETTER

PANDA EXPRESS - FOUNTAIN
4446 Venetucci Boulevard
Fountain, CO 80906

PREPARED FOR:
Panda Restaurant Group, Inc
1683 Walnut Grove Avenue
Rosemead, CA 91770

PREPARED BY:
Galloway & Company, Inc.
6162 S. Willow Drive, Suite 320
Greenwood Village, CO 80111

DATE:
March 3, 2022

ENGINEER'S STATEMENT

I affirm that this report and plan for the Final drainage design for Panda Express - Fountain was prepared by me (or under my direct supervision) in accordance with the provisions of the City of Colorado Springs Drainage Criteria Manual for the owners thereof. I understand that the City of Fountain does not and will not assume liability for drainage facilities designed by others.

Joe Park, PE #42470 Date
For and on behalf of Galloway & Company, Inc.

DEVELOPER'S CERTIFICATION

"Panda Restaurant Group, Inc. hereby certifies that the drainage facilities for Panda Express - Fountain shall be constructed according to the design presented in this report. I understand that the City of Fountain does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that the City of Fountain reviews drainage plans pursuant to the Municipal Code; but cannot, on behalf of Panda Express - Fountain, guarantee that final drainage design review will absolve Panda Restaurant Group, Inc. and/or their successors and/or assigns of future liability for improper design."

Authorized Signature Date
Panda Restaurant Group, Inc.

CITY OF FOUNTAIN

City Engineer Date

Conditions:

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I. INTRODUCTION

PRUPOSE

The purpose of the Drainage Compliance Letter is to show the proposed drainage concept for this project adheres to the drainage concept from ***Preliminary/Final Drainage Report for Lots 1-4 South Academy Highlands Filing No. 4***. Supporting calculations are following this letter to provide additional detail and support the information provided in the drainage concept and conclusions below.

LOCATION

Panda Express – Fountain, referred to herein as the 'site', 'project site' or 'Panda Express', is located at 4446 Venetucci Boulevard at the southwest corner of Walmart Heights and Venetucci Boulevard. The project site is Lot 1 of the South Academy Highlands Filing 4. The project site is bordered to the north and west by unplatted land; to the south by undeveloped Lot 2 of South Academy Highlands Filing 4; and to the east by Venetucci Boulevard. The project site is part of Section 4, Township 15 South, Range 66 West of the 6th Principal Meridian, City of Fountain, County of El Paso, State of Colorado. Refer to Appendix A for a Vicinity Map showing the project location and the surrounding area.

PROPOSED DEVELOPMENT

The project site covers ±1.341 acres. The proposed improvements include the development of a Panda Express Restaurant with drive thru, associated parking lot and drive aisles, utilities infrastructure and landscaping.

The existing site is currently vacant, however prior to Panda Express' development, the overall developer of South Academy Highlands Filing 4 shall construct an Extension of Walmart Heights and overlot grade the site. In the overlot graded condition, the site shall generally drain from south to north at approximately 2%.

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey, the project site consists of a Schamber-Razor complex soils, 8 to 50 percent slopes, Hydrologic Soil Group (HSG) 'A'. Reference Appendix A for the NRCS Soils information.

There are no major drainageways or irrigation facilities located on the site. The site currently contains a large temporary sediment basin that shall be replaced with individual sediment basins for each lot by the overall developer of South Academy Highlands Filing 4.

II. HISTORIC DRAINAGE

PREVIOUS REPORTS

The proposed site has been included in the previous drainage report – referred to herein as the 'existing report': ***Preliminary/Final Drainage Report for Lots 1-4 South Academy Highlands Filing No. 4***. Excerpts from this report can be found in Appendix A.

OVERALL BASIN DESCRIPTION

The project site is located within the Fishers Canyon Drainage Basin and at the time of development will have been overlot graded with the South Academy Highlands Filing No. 4 construction. Per the existing report, detention and water quality for the project site is included in Water Quality Facility T, existing north of the project site. An existing storm sewer system in being installed with the South

Academy Highlands Filing No. 4 construction, with a 24" stub being provided in the northeast corner of the project site.

The project site is not impacted by a FEMA designated floodplain per FEMA FIRMette map number 08041C0743G, map revised date December 7, 2018. The map is shown in Appendix A.

EXISTING SUB-BASIN DESCRIPTION

The project site lies within sub-basins A, B, C, and D identified in the existing report, existing design points 10, 9, 8, and 7, respectively. Reference Appendix A for existing sub-basin descriptions, summarized in the table below.

EXISTING SUB-BASIN SUMMARY TABLE

Sub-Basin	Design Point	Area (acres)	C_5	C_{100}	Q_5 (cfs)	Q_5 (cfs)
A	10	0.07	0.67	0.78	0.2	0.5
B	9	0.19	0.73	0.82	0.7	1.4
C	8	0.94	0.82	0.89	3.9	7.6
D	7	0.15	0.74	0.83	0.6	1.1

III. DESIGN CRITERIA

DEVELOPMENT CRITERIA REFERENCE

The proposed private storm sewer system was designed in accordance with the *City of Colorado Springs Drainage Criteria Manual* and the Mile High Flood District *Urban Storm Drainage Criteria Manual*.

HYDROLOGIC CRITIERIA

Hydrology calculations were performed using Chapter 6 of the *City of Colorado Springs Drainage Criteria Manual* (May 2014, revised January 2021)

The drainage calculations were based on the criteria manual Figure 6-5 and IDF equations to determine the intensity and are listed in Table 1 below.

Table 1 - Precipitation Data

Return Period	One Hour Depth (in).	Intensity (in/hr)
5-year	1.50	5.17
100-year	2.52	8.68

The rational method was used to calculate peak flows as the tributary areas are less than 100 acres. The rational method has been proven to be accurate for basins of this size and is based on the following formula:

Q = CIA

Where:

Q = Peak Discharge (cfs)
C = Runoff Coefficient
I = Runoff intensity (inches/hour)
A = Drainage area (acres)

The runoff coefficients are calculated based on land use, percent imperviousness, and design storm for each basin, as shown in the drainage criteria manual (Table 6-6). Composite percent impervious and C values were calculated using the streets, roofs, and lawns coefficients found in Table 6-6 of the manual.

HYDRAULIC CRITERIA

On-site storm sewer pipes will typically range from 12” to 24” RCP. The proposed storm sewer system was sized using Bentley Flowmaster to determine pipe flow capacities in the 100-year storm event.

The proposed Type R inlet was sized using the MHFD-Inlet_v5.01 spreadsheet. The allowable flow was based on the regulated maximum flow spread and gutter flow line depth, the street longitudinal and transverse slopes, the gutter geometry, the street roughness and any conveyance capacity behind the curb face. The proposed Type D inlet was sized using the weir equation to create a Head to Flow Capacity chart. Refer to Appendix C for street capacity calculations.

IV. FOUR STEP PROCESS

1. Employ Runoff Reduction Practices

The purpose of this step is to reduce runoff peaks and volumes from urbanizing areas through MDCIA (minimizing directly connected impervious areas). The intent of MDCIA is to reduce impervious area and route runoff from impervious areas through pervious areas to promote infiltration. The proposed development uses Low Impact Development (LID) practices to reduce runoff at the source. Rather than creating point discharges that are directly connected to impervious areas, runoff is routed through pervious areas to the extent possible.

2. Stabilize Drainageways

This step implements stabilization to existing natural channels to accommodate developed flows while protecting infrastructure and controlling sediment loading from erosion in the drainageways. This site releases into an existing storm sewer system, there by not needing any additional stabilization or erosion controls.

3. Provide Water Quality Capture Volume (WQCV)

Water quality for the project site is being provided by the regional Water Quality Facility T, and therefore is not applicable to the project site.

4. Implement Site Specific and Other Source Control BMPs

As this site is a commercial development, the area will need to consider the need for Industrial and Commercial BMPs. No industrial uses are proposed for the site and site operations will be contained within the building. Source control BMPs protect the release of pollutants from outdoor storage areas.

Trash enclosures will be provided near the building. All drainage from this site shall be routed through the regional water quality detention facility, minimizing contaminants into the downstream system.

V. DRAINAGE PLAN

GENERAL CONCEPT

The overall drainage pattern established with the overlot grading will not be altered with the proposed development. The site will ultimately consist of ground covered by pavement, rooftop, and landscaping. Existing sub-basins A, B, and D will have minor alterations, while sub-basin C will be divided into two (2) sub-basins based on the on-site grading. All flows shall enter the existing storm sewer system in Walmart Heights as in the existing report, and will be conveyed via the existing storm sewer system to Water Quality Facility T.

As specified in the existing report, off-site flows from Lots 2-4 of South Academy Highlands Filing 4 will not be accepted by Panda Express – Fountain and have not been accounted for in this drainage design.

SPECIFIC DETAILS

The following is a detailed description of the proposed onsite developed drainage patterns and conveyance facilities. Refer to the Drainage Plan located in Appendix D of this report.

Sub-basin A is approximately 0.05 acres comprised of a portion of Walmart Heights and adjacent landscaping on the northeast corner of the site with C_5 and C_{100} values of 0.80 and 0.89 respectively. Runoff from this basin will result in peak flows of 0.2 cfs and 0.4 cfs in the minor and major storm events respectively, not exceeding the runoff from Existing Sub-basin A. Runoff from this basin be conveyed with curb and gutter into Venetucci Boulevard (Design Point 6).

Sub-basin B is approximately 0.19 acres comprised of a portion of Walmart Heights and adjacent landscaping along the north of the site with C_5 and C_{100} values of 0.73 and 0.83 respectively. Runoff from this basin will result in peak flows of 0.7 cfs and 1.4 cfs in the minor and major storm events respectively, not exceeding the runoff from Existing Sub-basin A. Runoff from this basin be conveyed with curb and gutter into an existing 10’ Type R inlet (Design Point 2).

Sub-basin C-1 is approximately 0.15 acres comprised of proposed drive aisle and parking area with adjacent landscaping on the southwest corner of the site with C_5 and C_{100} values of 0.75 and 0.85 respectively. Runoff from this basin will result in peak flows of 0.6 cfs and 1.1 cfs in the minor and major storm events respectively. Runoff from this basin be conveyed with curb and gutter into a proposed 5’ Type R inlet (Design Point 3) and be conveyed northeast via the proposed onsite storm sewer system to the existing storm sewer stub (Design Point 5).

Sub-basin C-2 is approximately 0.78 acres comprised of the proposed Panda Express building, drive-thru, on-site drive aisles, and parking area with adjacent landscaping through the central and eastern of the site with C_5 and C_{100} values of 0.66 and 0.76 respectively. Runoff from this basin will result in peak flows of 2.6 cfs and 4.9 cfs in the minor and major storm events respectively. Runoff from this basin be conveyed with curb and gutter into a proposed Type D inlet (Design Point 4) and be conveyed northeast via the proposed onsite storm sewer system to the existing storm sewer stub (Design Point 5).

The combined flow of the proposed C-series Sub-basins does not exceed the flows from Existing Sub-basin C.

Sub-basin D is approximately 0.17 acres comprised of a portion of Walmart Heights and adjacent landscaping, as well as the proposed trash enclosure, along the west of the site with C_5 and C_{100} values of 0.59 and 0.73 respectively. Runoff from this basin will result in peak flows of 0.5 cfs and 1.0 cfs in the minor and major storm events respectively, not exceeding the runoff from Existing Sub-basin A. Runoff from this basin be conveyed with curb and gutter into an existing 5' Type R inlet (Design Point 1).

STORMWATER CONVEYANCE FACILITIES

Runoff from the project site will be conveyed through the site via overland flow to curb and gutter where the flows will be intercepted by proposed and existing storm sewer inlets and conveyed to the existing regional water quality detention facilities by the existing storm sewer system.

VI. CONCLUSIONS

Based on the above descriptions, proposed runoff from the project site is less than or equal to the runoff assumed in the existing report, showing conformance with the ***Preliminary/Final Drainage Report for Lots 1-4 South Academy Highlands Filing No. 4***. As specified in tihs existing report, off-site flows from Lots 2-4 of South Academy Highlands Filing 4 will not be accepted by Panda Express – Fountain and have not been accounted for in this drainage design.

COMPLIANCE WITH STANDARDS

The design presented in this drainage compliance letter for Panda Express - Fountain has been prepared in accordance with the design standards and guidelines presented in the *City of Colorado Springs Drainage Criteria Manual* and the Mile High Flood District *Urban Storm Drainage Criteria Manual*.

VARIANCES

No variance(s) requested at this time.

VI. REFERENCES

1. Urban Storm Drainage Criteria Manual, Mile High Flood District, January 2016 (with current revisions).

2. Drainage Criteria Manual, City of Colorado Springs, May 2014 (with January 2021 revisions).

3. Preliminary/Final Drainage Report for Lots 1-4 South Academy Highlands Filing No. 4, Prepared by Classic Consulting, January 2022.

4. Flood Insurance Rate Map – El Paso County, Colorado and Incorporated Areas Panel No. 08041C0743G, Effective December 7, 2018.

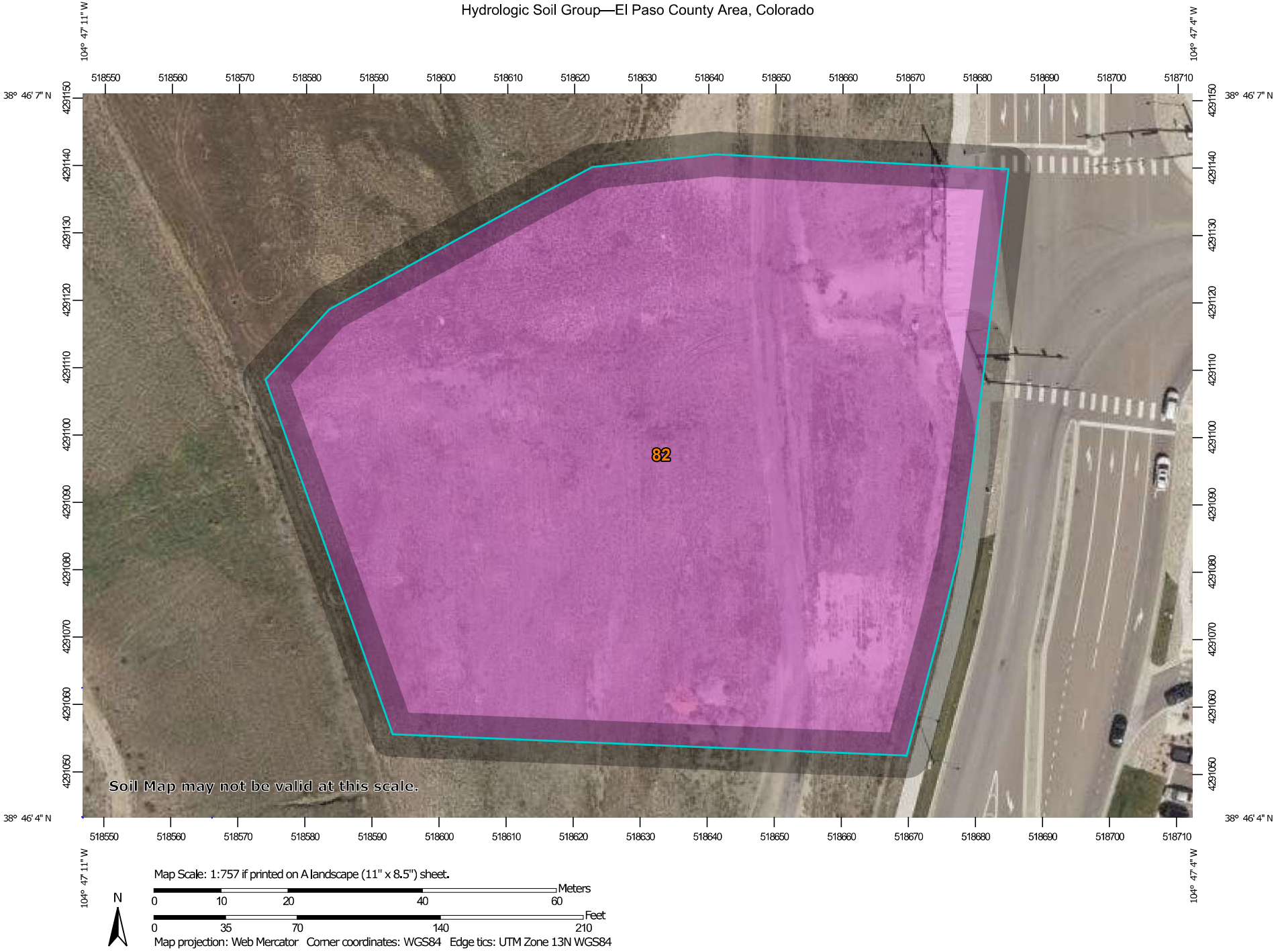
5. Soil Map – El Paso County Area, Colorado as available through the Natural Resources Conservation Service National Cooperative Soil Survey web site via Web Soil Survey 2.0.

APPENDIX A

Exhibits and Figures

Vicinity Map

Not to Scale



Map Scale: 1:757 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 35 70 140 210

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 19, Aug 31, 2021

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

Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 2018

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
82	Schamber-Razor complex, 8 to 50 percent slopes	A	1.9	100.0%
Totals for Area of Interest			**1.9**	**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

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 or additional 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 FIRM. Users should be aware that BFEs shown on the FIRM 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 FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table 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 FIRM.

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, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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, N/NGS12
National Geodetic Survey
SSMC-3, #9202
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 FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, and Anderson Consulting Engineers, Inc. These data are current as of 2008.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM 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 on which each community is located.

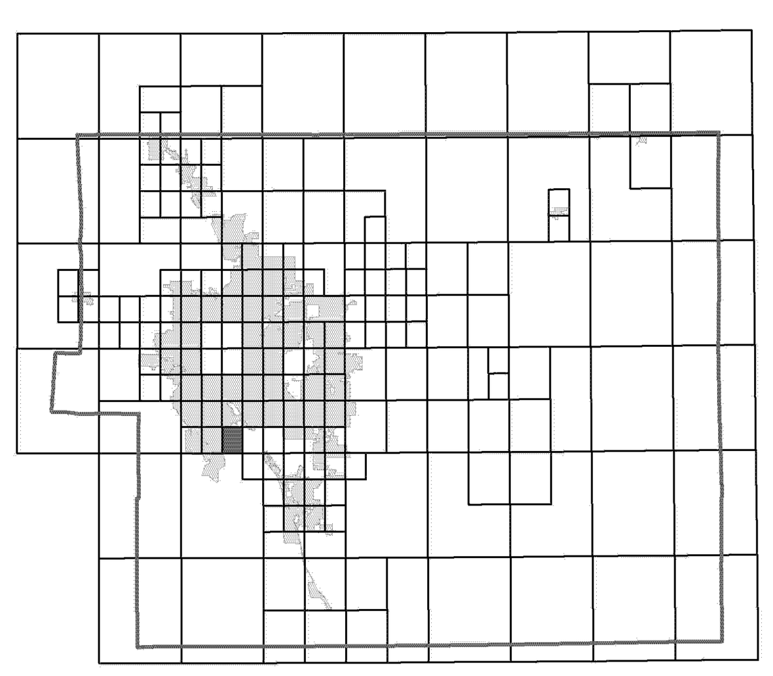
Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this 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/nfip.

El Paso County Vertical Datum Offset Table

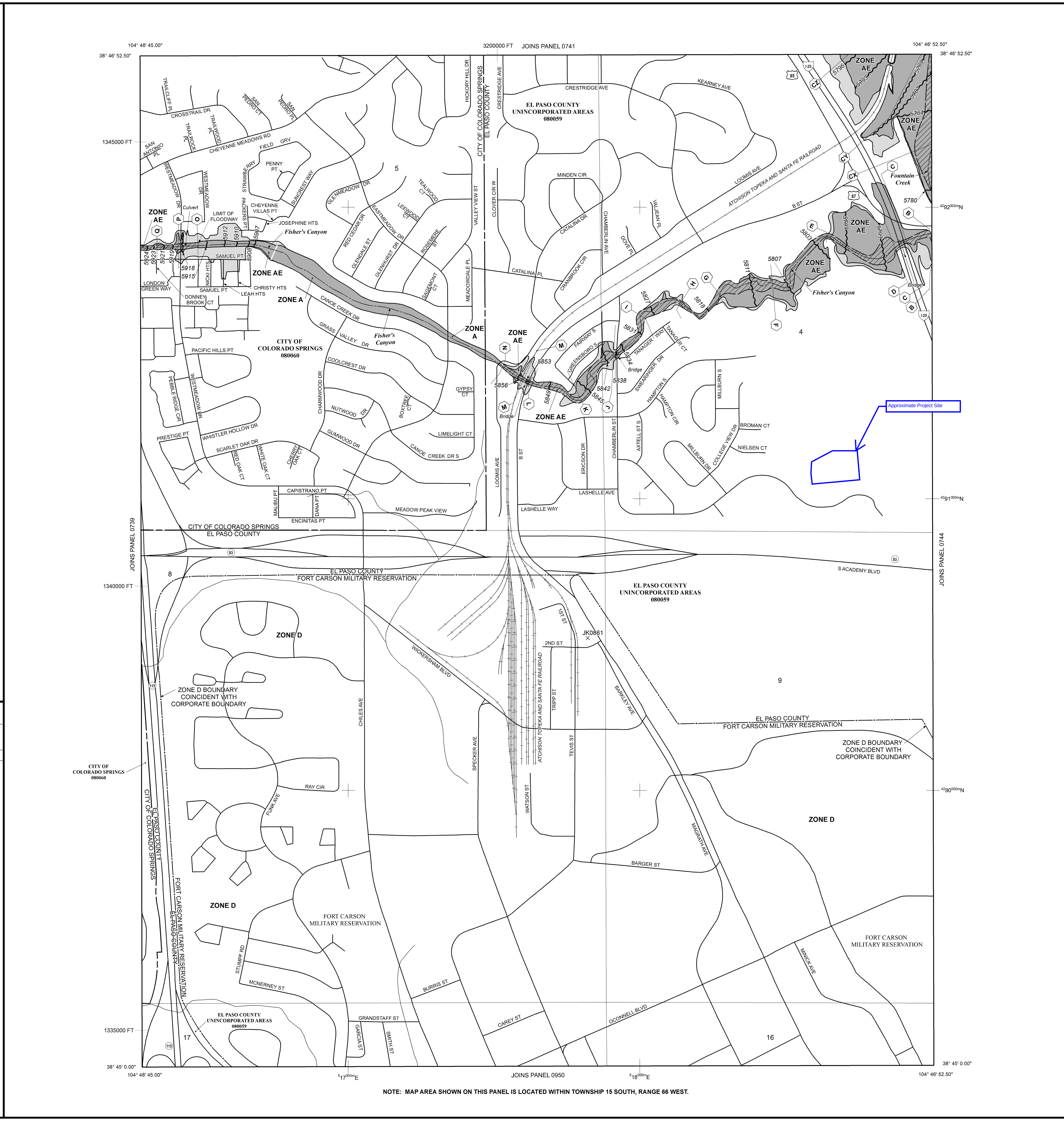
Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

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.



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. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. 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 AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE 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 encroachment 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 less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER 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.

~~ 513 ~~ Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

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

A —— A Cross section line

23 - - - - 23 Transect line

97° 07' 30.00" 32° 22' 30.00" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4275000mN 1000-meter Universal Transverse Mercator grid ticks, zone 13

6000000 FT 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection

DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)

● 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 7, 2018 - 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.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0743G

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO

AND INCORPORATED AREAS

PANEL 743 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0743	G
EL PASO COUNTY	080059	0743	G

Notice to User: The **Map Number** shown below should be used when placing map orders: the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08041C0743G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

Pipe 7 (Private 30" RCP, Q_5 = 10.2 cfs, Q_{100}= 19.9 cfs) conveys the combined runoff from this manhole to the north within the rear drive aisle.

Design Point 7 (Q_5 = 0.5 cfs, Q_{100}= 1.1 cfs) consists of runoff from Basin D, 0.15 acres of rear drive aisle and back of Lot 1 development. This runoff will drain over the asphalt and along the curb and gutter to a proposed 5.0' CDOT Type R curb (at-grade) inlet. Pipe 8 (18" RCP) conveys the intercepted runoff to the storm main in the rear drive aisle. Pipe 9 (Private 30" RCP, Q_5 = 10.6 cfs, Q_{100}= 20.7 cfs) conveys the combined runoff from this manhole (Pipes 7 & 8) to the north within the rear drive aisle.

Design Point 8 (Q_5 = 3.9 cfs, Q_{100}= 7.6 cfs) consists of runoff from Basin C, 0.94 acres of Lot 1 development. A future Final Drainage Repot for Lot 1 will be completed that will detail the collection system and connection to this 18" storm stub (Pipe 10) provided with the storm sewer main and rear drive aisle construction. Pipe 10 connects to a junction manhole with Pipes 9 & 11.

Design Point 9 (Q_5 = 0.7 cfs, Q_{100}= 1.4 cfs) consists of runoff from Basin B, 0.19 acres of main entrance and rear drive aisle within Lot 1. This runoff will drain over the asphalt and along the curb and gutter to a proposed 10.0' CDOT Type R curb (at-grade) inlet. Pipe 11 (Private 18") conveys the intercepted runoff to a junction manhole with Pipes 9 & 10. This manhole connects with the existing 30" RCP stub (Pipe 12) from Venetucci Blvd. and South Academy Highlands Filing No. 1 infrastructure. Pipe 12 is the existing Private 30" RCP and contains fully developed flow rates of Q_5 = 14.8 cfs and Q_{100}= 28.8 cfs. The previously approved Filing No. 1 drainage report assumed a fully developed condition flow rate in this 30" RCP of Q_5 = 17.5 cfs and Q_{100}= 32.8 cfs, higher than the actual developed conditions of Lots 1-4 Filing No. 4. The previously approved report and infrastructure accounted for the same acreage of proposed Lots 1-4 commercial development in the downstream storm sewer main and full spectrum detention and storm water quality facility 'T' located prior to Fisher's Canyon drainage way. As previously discussed, this facility was designed and installed per all applicable criteria and no improvements are required based upon the development of Lots 1-4. As there have been no change to the tributary area, land use, drainage patterns, and a slight decrease in runoff rates, there is no need for additional analysis of the existing downstream infrastructure and the development of Lots 1-4

South Academy Highlands Filing No. 4 will not hinder adjacent properties or downstream storm sewer facilities.

Four (4) new temporary sediment basins are proposed (one for each lot) to replace the larger existing temporary sediment basin that exists within Basins B & C. Temporary sediment basin relocation design is shown on the site grading plan and construction drawings.

Design Point 10 (Q_5 = 0.2 cfs, Q_{100}= 0.5 cfs) consists of runoff from Basin A, 0.07 acres of existing Venetucci Blvd. and proposed entrance into the Lots 1-4 development. This runoff drains onto the existing roadway and drains to downstream facilities and ultimately to the downstream Pond 'T'. As this runoff is very minor and the proposed storm system effectively intercepts the proposed development drainage, additional downstream analysis is not warranted.

DRAINAGE CRITERIA

Hydrologic calculations were performed using the City of Colorado Springs/El Paso County Drainage Criteria Manual, Revised January 2021. The Rational Method was used to estimate stormwater runoff (5-year and 100-year recurrence intervals) to the proposed inlets, storm sewer pipes, and provided 30" storm sewer stub for the entire Lots 1 – 4 Filing No. 4 development. The UDFCD UD-Inlet workbook per Mile High Flood District (previously the Urban Drainage and Flood Control District) was used to size the proposed storm inlets. Hydraulic Grade Line (HGL) calculations for the 100-year storm event were calculated using UD-Sewer 2009 per Mile High Flood District and at no times is the 100-year line within 1.0' to the finished ground of the storm alignments. A Site-Level Low Impact Development form (IRF form) is included in the Appendix and was completed using the UD-BMP workbook from Mile High Flood District and shows a composite imperviousness of 88.1% for the 3.85 acres of developed runoff within Pipe 12.

WATER QUALITY SUMMARY

The City of Fountain has required the Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long-term source controls. The Four Step Process pertains to management of

JOB NAME: *South Academy Highlands Filing No. 4*
JOB NUMBER: *2186.90*
DATE: *01/30/22*
CALCULATED BY: *MAL*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY (DEVELOPED)

BASIN	TOTAL AREA (AC)	IMPERVIOUS AREA / STREETS			LANDSCAPE/UNDEVELOPED AREAS			WEIGHTED		**WEIGHTED CA**		**USE**
		AREA (AC)	C(5)	C(100)	AREA (AC)	C(5)	C(100)	C(5)	C(100)	**CA(5)**	**CA(100)**	
A	0.07	0.05	0.90	0.95	0.02	0.08	0.35	0.67	0.78	**0.05**	**0.05**	**Drive Aisle**
B	0.19	0.15	0.90	0.95	0.04	0.08	0.35	0.73	0.82	**0.14**	**0.16**	**Drive Aisle**
C	0.94	0.85	0.90	0.95	0.09	0.08	0.35	0.82	0.89	**0.77**	**0.84**	**LOT 1**
D	0.15	0.12	0.90	0.95	0.03	0.08	0.35	0.74	0.83	**0.11**	**0.12**	**Drive Aisle**
E	0.20	0.18	0.90	0.95	0.02	0.08	0.35	0.82	0.89	**0.16**	**0.18**	**Drive Aisle**
F	0.65	0.59	0.90	0.95	0.06	0.08	0.35	0.82	0.89	**0.54**	**0.58**	**LOT 2**
G	0.16	0.14	0.90	0.95	0.02	0.08	0.35	0.80	0.88	**0.13**	**0.14**	**Drive Aisle**
H	0.16	0.15	0.90	0.95	0.01	0.08	0.35	0.85	0.91	**0.14**	**0.15**	**Drive Aisle**
J	0.57	0.50	0.90	0.95	0.07	0.08	0.35	0.80	0.88	**0.46**	**0.50**	**LOT 3**
K	0.83	0.71	0.90	0.95	0.12	0.08	0.35	0.78	0.86	**0.65**	**0.72**	**LOT 4**
Q	2.06	0.00	0.90	0.95	2.06	0.08	0.35	0.08	0.35	**0.16**	**0.72**	**EX. SLOPE**
EX-1	3.69	0.00	0.90	0.95	3.69	0.08	0.35	0.08	0.35	**0.30**	**1.29**	**EXIST**
EX-2	2.37	0.00	0.90	0.95	2.37	0.08	0.35	0.08	0.35	**0.19**	**0.83**	**EXIST**

JOB NAME:	***South Academy Highlands Filing No. 4***
JOB NUMBER:	***2186.90***
DATE:	***01/30/22***
CALC'D BY:	***MAL***

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY (DEVELOPED)

BASIN	WEIGHTED		OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY		TOTAL FLOWS	
	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	TOTAL (min)	I(5) (in/hr)	I(100) (in/hr)	Q(5) (cfs)	Q(100) (cfs)
A	0.05	0.05	0.9	10	0.15	1.0	40	1.5%	4.3	0.2	5.0	5.10	9.07	**0.2**	**0.5**
B	0.14	0.16	0.9	10	0.15	1.0	190	1.5%	4.3	0.7	5.0	5.10	9.07	**0.7**	**1.4**
C	0.77	0.84	0.9	10	0.15	1.0	190	1.5%	4.3	0.7	5.0	5.10	9.07	**3.9**	**7.6**
D	0.11	0.12	0.9	10	0.15	1.0	120	1.5%	4.3	0.5	5.0	5.10	9.07	**0.6**	**1.1**
E	0.16	0.18	0.9	10	0.15	1.0	130	1.5%	4.3	0.5	5.0	5.10	9.07	**0.8**	**1.6**
F	0.54	0.58	0.9	10	0.15	1.0	220	1.5%	4.3	0.9	5.0	5.10	9.07	**2.7**	**5.3**
G	0.13	0.14	0.9	10	0.15	1.0	120	1.5%	4.3	0.5	5.0	5.10	9.07	**0.7**	**1.3**
H	0.14	0.15	0.9	10	0.15	1.0	210	1.5%	4.3	0.8	5.0	5.10	9.07	**0.7**	**1.3**
J	0.46	0.50	0.9	10	0.15	1.0	200	1.5%	4.3	0.8	5.0	5.10	9.07	**2.3**	**4.5**
K	0.65	0.72	0.9	10	0.15	1.0	230	1.5%	4.3	0.9	5.0	5.10	9.07	**3.3**	**6.5**
Q	0.16	0.72	0.08	75	26	5.1	360	4.4%	7.3	0.8	5.9	4.87	8.66	**0.8**	**6.2**
EX-1	0.30	1.29	0.08	50	2	8.5	500	2.0%	4.9	1.7	10.2	4.07	7.23	**1.2**	**9.3**
EX-2	0.19	0.83	0.08	10	3.33	1.9	90	33.0%	20.1	0.1	2.0	6.06	10.77	**1.1**	**8.9**

STORM SYSTEM NOTES:

ALL PROPOSED STORM SEWER IS REINFORCED CONCRETE PIPE (RCP) AND PRIVATE WITH A CONNECTION TO THE PRIVATE STORM MAIN IN VENETUCCI BLVD

FULL SPECTRUM DETENTION AND STORM WATER QUALITY FOR THE PROPOSED SITE IS PROVIDED AT THE DOWNSTREAM PRIVATE FACILITY REFERRED TO AS SOUTH ACADEMY HIGHLANDS FILING NO. 1 FACILITY 'T'.

ALL INLETS ARE PRIVATE CDOT TYPE R CURB INLETS.

BASIN RUNOFF SUMMARY		
BASIN	Q5 (CFS)	Q100 (CFS)
A	0.2	0.5
B	0.7	1.4
C	3.9	7.6
D	0.6	1.1
E	0.8	1.6
F	2.7	5.3
G	0.7	1.3
H	0.7	1.3
J	2.3	4.5
K	3.3	6.5
Q	0.8	6.2

DESIGN POINT SUMMARY			
DESIGN POINT	Q5 (CFS)	Q100 (CFS)	OUTFALL
1	3.3	6.5	18" STUB
2	0.7	1.3	10' TYPE R (A-G)
3	2.3	4.5	18" STUB
4	0.6	1.3	5' TYPE R (A-G)
5	2.7	5.3	18" STUB
6	0.9	1.7	10' TYPE R (A-G)
7	0.5	1.1	5' TYPE R (A-G)
8	3.9	7.6	18" STUB
9	0.7	1.4	10' TYPE R (A-G)
10	0.2	0.5	SURFACE

PIPE RUN SUMMARY			
PIPE	Q5 (CFS)	Q100 (CFS)	SIZE
1	3.3	6.5	18"
2	4.0	7.8	18"
3	2.3	4.5	18"
4	6.9	13.4	24"
5	2.7	5.3	18"
6	3.6	7.0	18"
7	10.2	19.9	30"
8	0.5	1.1	18"
9	10.6	20.7	30"
10	3.9	7.6	18"
11	0.7	1.4	18"
12	14.8	28.8	30"

EXISTING STRATMOOR SOUTH SUBDIVISION FILING NO. 3

EXISTING 20' SANITARY EASEMENT BOOK 2806, PAGE 518

EXISTING STORM SEWER SYSTEM (FILING NO. 1)

UNPLATTED OWNER: CITY OF COLORADO SPRINGS

NO BUILD AREA (OPEN SPACE)

EXISTING VENETUCCI BOULEVARD

EXISTING SOUTH ACADEMY BOULEVARD

EXISTING MONUMENT SIGN

LOT 4 1.970 AC

LOT 3 1.303 AC

LOT 2 1.549 AC

LOT 1 1.341 AC

UNPLATTED

EXISTING TEMPORARY SEDIMENT BASIN TO BE REMOVED AND INDIVIDUAL SEDIMENT BASINS INSTALLED FOR EACH LOT AS SHOWN

Δ=35°30'48" R=238.00' L=147.52'

N89°56'03"E 62.20'

Δ=6°00'33" L=77.98'

Δ=7°24'02" L=96.03'

131.06'

49.75'

234.19'

194.07'

EXISTING PRIVATE 30" RCP FOR DEVELOPED RUNOFF

LOT 2 SOUTH ACADEMY HIGHLANDS FILING NO. 1A

LOT 1 SOUTH ACADEMY HIGHLANDS FILING NO. 1A

EXISTING WALMART HEIGHTS

Q 2.06 · H 0.16 · G 0.16 · E 0.20 · D 0.15 · K 0.83 · J 0.57 · F 0.65 · C 0.94 · B 0.19 · A 0.07

40 20 0 40 80

SCALE: 1" = 40'

LEGEND

- EXISTING GROUND CONTOUR (5910)
- PROPOSED FINISHED CONTOUR 5910
- SUBDIVISION BOUNDARY
- PROPOSED BASIN BOUNDARY
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- BASIN IDENTIFIER / AREA IN ACRES: D 1.41
- DESIGN POINT: 10
- PIPE RUN: 1

NO.	REVISION	DATE

CLASSIC CONSULTING SM
619 N. Cascade Avenue, Suite 200 (719)785-0790
Colorado Springs, Colorado 80903 (719)785-0799(Fax)

SOUTH ACADEMY HIGHLANDS FILING NO. 4

PRELIMINARY/FINAL DRAINAGE REPORT
DEVELOPED CONDITIONS

CLASSIC CONSULTING

DESIGNED BY	MAL	SCALE	DATE 01/30/22
DRAWN BY	MAL	(H) 1"= 40'	SHEET 2 OF 2
CHECKED BY		(V) 1"= N/A	JOB NO. 2186.90

N:\2186\DRAWINGS\DEVELOPMENT\2186DR-PDR-MAP.dwg, 1/30/2022 4:30:54 PM, 1:1

APPENDIX B

Hydrologic Computations

COMPOSITE % IMPERVIOUS CALCULATIONS

Subdivision: South Academy Highlands Filing 4
Location: CO, Colorado Springs

Project Name: Panda Express - Fountain
Project No.: HVT000007
Calculated By: DDJ
Checked By: JDP
Date: 3/3/22

Basin ID	Total Area (ac)	Paved Roads			Lawns			Roofs			Basins Total Weighted % Imp.
		% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	% Imp.	Area (ac)	Weighted % Imp.	
A	0.05	100	0.05	87.9	0	0.01	0.0	90	0.00	0.00	87.9
B	0.19	100	0.15	79.1	0	0.04	0.0	90	0.00	0.00	79.1
C-1	0.15	100	0.12	81.4	0	0.03	0.0	90	0.00	0.00	81.4
C-2	0.78	100	0.56	71.9	0	0.16	0.0	90	0.06	7.30	79.2
D	0.17	100	0.10	61.8	0	0.06	0.0	90	0.00	0.00	61.8

Galloway

STANDARD FORM SF-2
TIME OF CONCENTRATION

Subdivision: South Academy Highlands Filing 4
Location: CO, Colorado Springs

Project Name: Panda Express - Fountain
Project No.: HVT000007
Calculated By: DDJ
Checked By: JDP
Date: 3/3/22

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (AC)	Hydrologic Soils Group	Impervious (%)	C_{100}	C_5	L (FT)	S (%)	T_i (MIN)	L (FT)	S (%)	Cv	VEL. (FPS)	T_t (MIN)	COMP. T_c (MIN)	TOTAL LENGTH (FT)	Urbanized T_c (MIN)	T_c (MIN)
A	0.05	A	87.9	0.89	0.80												5.0
B	0.19	A	79.1	0.83	0.73	50	2.0	3.8	160	1.5	20.0	2.4	1.1	4.9	210.0	11.2	5.0
C-1	0.15	A	81.4	0.85	0.75	30	2.0	2.8	120	1.0	20.0	2.0	1.0	3.8	150.0	10.8	5.0
C-2	0.78	A	79.2	0.76	0.66	100	3.5	5.3	100	3.5	20.0	3.7	0.4	5.7	200.0	11.1	5.7
D	0.17	A	61.8	0.73	0.59	40	2.0	4.7	120	1.5	20.0	2.4	0.8	5.5	160.0	10.9	5.5

NOTES:

T_i = (0.395*(1.1 - C_5)*(L)^0.5)/((S)^0.33), S in ft/ft

T_t=L/60V (Velocity From Fig. 501)

Velocity V=Cv*S^0.5, S in ft/ft

Tc Check = 10+L/180

For Urbanized basins a minimum T_c of 5.0 minutes is required.

For non-urbanized basins a minimum T_c of 10.0 minutes is required

Galloway

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: South Academy Highlands Filing 4
Location: CO, Colorado Springs
Design Storm: 5-Year

Project Name: Panda Express - Fountain
Project No.: HVT000007
Calculated By: DDJ
Checked By: JDP
Date: 3/3/22

STREET	Design Point	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	
	6	A	0.05	0.80	5.0	0.04	5.17	0.2													Flows into Venetucci Blvd
	2	B	0.19	0.73	5.0	0.14	5.17	0.7													Existing 10' Type R Inlet
	3	C-1	0.15	0.75	5.0	0.11	5.17	0.6													Proposed 5' Type R Inlet
	4	C-2	0.78	0.66	5.7	0.52	4.97	2.6													Proposed Type D Inlet
	5								5.7	0.63	4.97	3.1									Total C-Series flow to existing stub
	1	D	0.17	0.59	5.5	0.10	5.02	0.5													Existing 5' Type R Inlet

STANDARD FORM SF-3
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Subdivision: South Academy Highlands Filing 4
Location: CO, Colorado Springs
Design Storm: 100-Year

Project Name: Panda Express - Fountain
Project No.: HVT000007
Calculated By: DDJ
Checked By: JDP
Date: 3/3/22

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
STREET	Design Point	Basin ID	Area (Ac)	Runoff Coeff.	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Tc (min)	C*A (Ac)	I (in/hr)	Q (cfs)	Slope (%)	Street Flow (cfs)	Design Flow (cfs)	Slope (%)	Pipe Size (inches)	Length (ft)	Velocity (fps)	Tt (min)	REMARKS
	6	A	0.05	0.89	5.0	0.05	8.68	0.4													Flows into Venetucci Blvd
	2	B	0.19	0.83	5.0	0.16	8.68	1.4													Existing 10' Type R Inlet
	3	C-1	0.15	0.85	5.0	0.13	8.68	1.1													Proposed 5' Type R Inlet
	4	C-2	0.78	0.76	5.7	0.59	8.34	4.9													Proposed Type D Inlet
	5								5.7	0.72	8.34	6.0									Total C-Series flow to existing stub
	1	D	0.17	0.73	5.5	0.12	8.42	1.0													Existing 5' Type R Inlet

APPENDIX C

Hydraulic Computations

12" Pipe Capacity

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	1.00	ft
Discharge	1.10	ft³/s

Results

Normal Depth	0.46	ft
Flow Area	0.35	ft²
Wetted Perimeter	1.49	ft
Hydraulic Radius	0.24	ft
Top Width	1.00	ft
Critical Depth	0.44	ft
Percent Full	46.2	%
Critical Slope	0.00588	ft/ft
Velocity	3.10	ft/s
Velocity Head	0.15	ft
Specific Energy	0.61	ft
Froude Number	0.92	
Maximum Discharge	2.71	ft³/s
Discharge Full	2.52	ft³/s
Slope Full	0.00095	ft/ft
Flow Type	SubCritical	

Maximum discharge is greater than 100-year flow

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	46.21	%
Downstream Velocity	Infinity	ft/s

18" Pipe Capacity

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.00500	ft/ft
Diameter	1.50	ft
Discharge	4.90	ft³/s

Results

Normal Depth	0.89	ft
Flow Area	1.09	ft²
Wetted Perimeter	2.64	ft
Hydraulic Radius	0.41	ft
Top Width	1.47	ft
Critical Depth	0.85	ft
Percent Full	59.3	%
Critical Slope	0.00574	ft/ft
Velocity	4.49	ft/s
Velocity Head	0.31	ft
Specific Energy	1.20	ft
Froude Number	0.92	
Maximum Discharge	7.99	ft³/s
Discharge Full	7.43	ft³/s
Slope Full	0.00218	ft/ft
Flow Type	SubCritical	

Maximum discharge is greater than 100-year flow

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

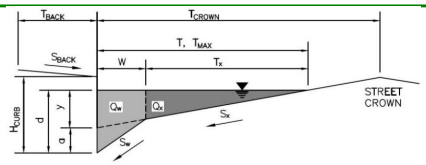
Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	59.30	%
Downstream Velocity	Infinity	ft/s

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: **HVT000007 - PANDA EXPRESS - FOUNTAIN**

Inlet ID: **DPS - 5' TYPE R**



Gutter Geometry:			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	0.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.000	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.020	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	42.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.025	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.016	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	9.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

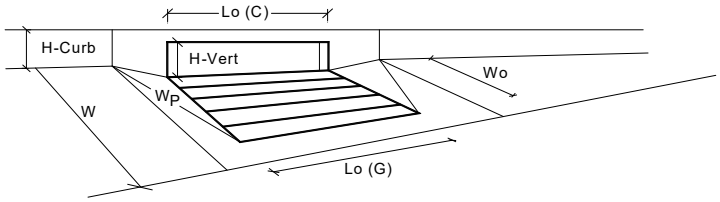
Maximum Capacity for 1/2 Street based On Allowable Spread		Minor Storm	Major Storm	
Water Depth without Gutter Depression (Eq. ST-2)	y =	2.70	5.40	inches
Vertical Depth between Gutter Lip and Gutter Flowline (usually 2")	d_C =	2.0	2.0	inches
Gutter Depression (d_C - (W * S_x * 12))	a =	1.39	1.39	inches
Water Depth at Gutter Flowline	d =	4.09	6.79	inches
Allowable Spread for Discharge outside the Gutter Section W (T - W)	T_X =	7.0	16.0	ft
Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. ST-7)	E_O =	0.597	0.315	
Discharge outside the Gutter Section W, carried in Section T_X	Q_X =	0.0	0.0	cfs
Discharge within the Gutter Section W (Q_T - Q_X)	Q_W =	0.0	0.0	cfs
Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)	Q_{BACK} =	0.0	#DIV/0!	cfs
Maximum Flow Based On Allowable Spread	**Q_T =**	**SUMP**	**SUMP**	**cfs**
Flow Velocity within the Gutter Section	V =	0.0	0.0	fps
V*d Product: Flow Velocity times Gutter Flowline Depth	V*d =	0.0	0.0	

Maximum Capacity for 1/2 Street based on Allowable Depth		Minor Storm	Major Storm	
Theoretical Water Spread	T_{TH} =	15.4	15.4	ft
Theoretical Spread for Discharge outside the Gutter Section W (T - W)	$T_{X\,TH}$ =	13.4	13.4	ft
Gutter Flow to Design Flow Ratio by FHWA HEC-22 method (Eq. ST-7)	E_O =	0.368	0.368	
Theoretical Discharge outside the Gutter Section W, carried in Section $T_{X\,TH}$	$Q_{X\,TH}$ =	0.0	0.0	cfs
Actual Discharge outside the Gutter Section W, (limited by distance T_{CROWN})	Q_X =	0.0	0.0	cfs
Discharge within the Gutter Section W (Q_d - Q_X)	Q_W =	0.0	0.0	cfs
Discharge Behind the Curb (e.g., sidewalk, driveways, & lawns)	Q_{BACK} =	0.0	0.0	cfs
Total Discharge for Major & Minor Storm (Pre-Safety Factor)	Q =	0.0	0.0	cfs
Average Flow Velocity Within the Gutter Section	V =	0.0	0.0	fps
V*d Product: Flow Velocity Times Gutter Flowline Depth	V*d =	0.0	0.0	
Slope-Based Depth Safety Reduction Factor for Major & Minor (d ≥ 6") Storm	R =	SUMP	SUMP	
Max Flow Based on Allowable Depth (Safety Factor Applied)	**Q_d =**	**SUMP**	**SUMP**	**cfs**
Resultant Flow Depth at Gutter Flowline (Safety Factor Applied)	d =			inches
Resultant Flow Depth at Street Crown (Safety Factor Applied)	d_{CROWN} =			inches

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

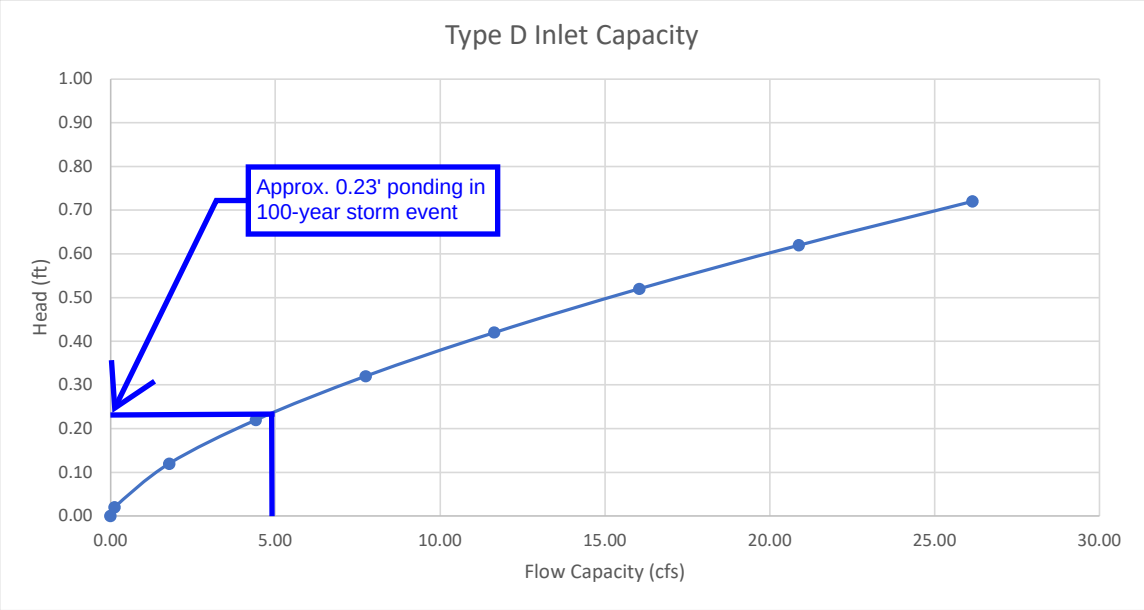
MHFD-Inlet, Version 5.01 (April 2021)



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	4.1	6.0	inches
Grate Information		MINOR	MAJOR	Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	63.40	63.40	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.18	0.33	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.52	0.77	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**2.0**	**5.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	0.6	1.1	cfs

Type D Inlet Capacity

	Stage Elevation (ft)	Flow (cfs)	Head (ft)
Top of grate	5891.08	0.00	0.00
	5891.10	0.12	0.02
	5891.20	1.78	0.12
	5891.30	4.41	0.22
	5891.40	7.74	0.32
	5891.50	11.64	0.42
	5891.60	16.04	0.52
	5891.70	20.88	0.62
	5891.80	26.14	0.72



Flow capacity found using weir equation at regular depth intervals

APPENDIX D

Storm Sewer OPC

Galloway
Planning. Architecture. Engineering.
6162 S. Willow Dr, Suite 320
Greenwood Village, CO 80111
(303) 770-8884 (Phone)
(303) 770-3636 (Fax)

Date: 3/3/2022
Project: Panda Express - Fountain
Location: 4446 Venetucci Blvd.
By: DDJ

Opinion of Probable Cost for STORM IMPROVEMENTS

PANDA EXPRESS - FOUNTAIN

Note: There are no public improvements associated with this project

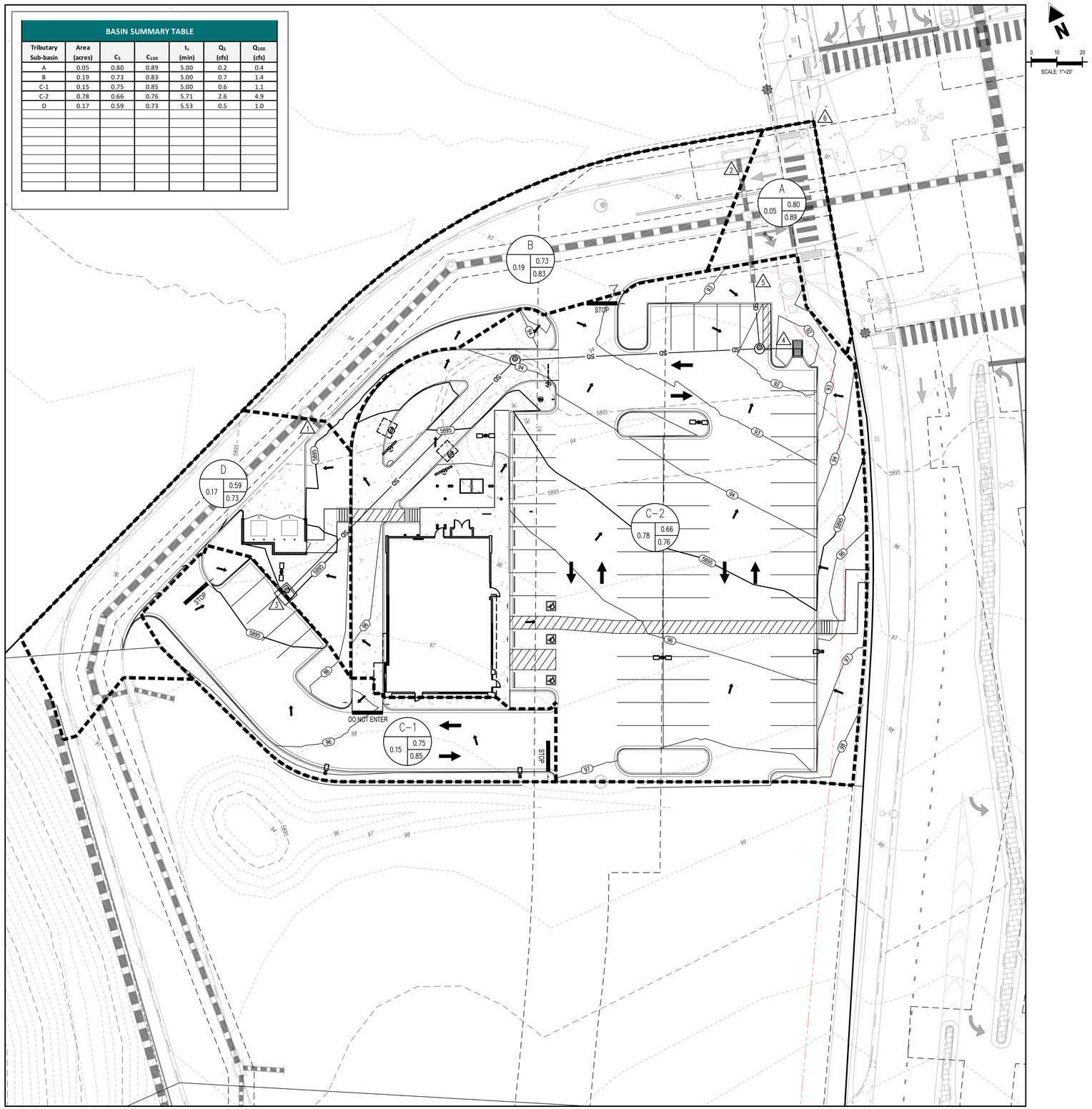
PRIVATE STORM IMPROVEMENTS		Quantity	Unit	Unit Cost	Total
5' Type R Inlet		1	EA	$3,500.00	$3,500.00
Type D Inlet		1	EA	$8,000.00	$8,000.00
4' Dia Manhole		2	EA	$4,000.00	$8,000.00
12" RCP Pipe		224	LF	$55.00	$12,320.00
18" RCP Pipe		15	LF	$60.00	$900.00
24" RCP Pipe		26	LF	$80.00	$2,080.00
Contingency (+/-)		10%			$3,480.00
TOTAL IMPROVEMENTS					**$34,780.00**

APPENDIX E

Drainage Map

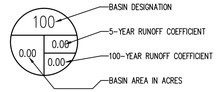
BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	C_5	C_{100}	t_c (min)	Q_5 (cfs)	Q_{100} (cfs)
A	0.05	0.80	0.89	5.00	0.2	0.4
B	0.19	0.73	0.83	5.00	0.7	1.4
C-1	0.15	0.75	0.85	5.00	0.6	1.1
C-2	0.78	0.66	0.76	5.71	2.6	4.9
D	0.17	0.59	0.73	5.53	0.5	1.0



SITE LEGEND

- PROPERTY BOUNDARY LINE
- PROPOSED PROPERTY LINE
- GRADE BREAK
- EXISTING EASEMENT LINE
- PROPOSED SAWCUT
- PROPOSED CURB AND GUTTER
- EXISTING CURB AND GUTTER
- EXISTING STORM SEWER INLET
- EXISTING STORM SEWER MANHOLE
- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIBER OPTIC PULL BOX
- EXISTING FIBER OPTIC VAULT
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING ELECTRIC RISER
- EXISTING LIGHT POLE
- EXISTING TREE
- PROPOSED STORM SEWER INLET
- PROPOSED FIRE HYDRANT
- PROPOSED WATER METER
- PROPOSED FIBER OPTIC PEDESTAL
- PROPOSED SIGN
- EXISTING SIDEWALK
- PROPOSED CONCRETE
- SD — PROPOSED STORM SEWER
- 4555 — EXISTING MAJOR CONTOUR
- 54 — EXISTING MINOR CONTOUR
- 4555 — PROPOSED MAJOR CONTOUR
- 54 — PROPOSED MINOR CONTOUR
- 5 — DESIGN POINT
- FLOW ARROW
- MAJOR BASIN BOUNDARY LINE



SURVEYOR TO OBTAIN AUTOCAD FILE FROM ENGINEER AND VERIFY ALL HORIZONTAL CONTROL DIMENSIONING PRIOR TO CONSTRUCTION STAKING. SURVEYOR MUST VERIFY ALL BENCHMARK, BASIS OF BEARING AND DATUM INFORMATION TO ENSURE IMPROVEMENTS WILL BE AT THE SAME HORIZONTAL AND VERTICAL LOCATIONS SHOWN ON THE DESIGN CONSTRUCTION DRAWINGS. PRIOR TO CONSTRUCTION STAKING ANY DISCREPANCY MUST BE REPORTED TO OWNER AND ENGINEER PRIOR TO CONTINUATION OF ANY FURTHER STAKING OR CONSTRUCTION WORK.

CONTRACTOR RESPONSIBLE FOR AS-BUILT DRAWINGS, TESTS, REPORTS AND/OR ANY OTHER CERTIFICATES OR INFORMATION AS REQUIRED FOR ACCEPTANCE OF WORK FROM COUNTY, UTILITY DISTRICTS OR ANY OTHER GOVERNING AGENCY.

NOTE: CONTRACTOR SHALL PROTECT ALL EXISTING SURVEY MONUMENTATION. CONTRACTOR SHALL HAVE LICENSED SURVEYOR REPLACE ANY DAMAGED OR DISTURBED MONUMENTATION AT THEIR COST.

NOTE: CONTRACTOR MUST COORDINATE WORK WITH UTILITY COMPANY AND CITY PRIOR TO BEGINNING WORK AND IS RESPONSIBLE FOR ALL MATERIALS, LABOR, REPAIRS, ETC. TO COMPLETE WORK AND RESTORE AREA TO SAME STATE PRIOR TO STARTING WORK.

CAUTION – NOTICE TO CONTRACTOR

1. ALL UTILITY LOCATIONS SHOWN ARE BASED ON MAPS PROVIDED BY THE APPROPRIATE UTILITY COMPANY AND FIELD SURFACE EVIDENCE AT THE TIME OF SURVEY AND IS TO BE CONSIDERED AN APPROXIMATE LOCATION ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE FIELD LOCATION OF ALL UTILITIES, PUBLIC OR PRIVATE, WHETHER SHOWN ON THE PLANS OR NOT, PRIOR TO CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO CONSTRUCTION.
2. WHERE A PROPOSED UTILITY CROSSES AN EXISTING UTILITY, IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF SUCH EXISTING UTILITY, EITHER THROUGH POTHOLING OR ALTERNATIVE METHOD. REPORT INFORMATION TO THE ENGINEER PRIOR TO CONSTRUCTION.

811 Know what's below. Call before you dig.

PANDA EXPRESS, INC.
1683 Walnut Grove Ave.
Rosemead, California
91770
Telephone: 626.799.9898
Facsimile: 626.372.8288

REVISIONS:

ISSUE DATE:

1	1ST SDP SUBMITTAL	03-03-22

DRAWN BY: DDJ CHECKED BY: JDP

PANDA PROJECT #: S8-22-D8204
PANDA STORE #: D8204
ARCH PROJECT #: 21013

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PANDA EXPRESS

HEIGHTS VENTURE
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FOUNTAIN, CO 80906

PROPOSED DRAINAGE MAP

DMAP

SITE PLAN REVIEW

TRUE WARM & WELCOME 2300 R5