

**PRELIMINARY
HYDROLOGY/DRAINAGE STUDY**

For

**Federal Blvd. Marijuana Outlet
Conditional Use Permit**

6176 Federal Blvd.
San Diego, CA, 92114
Portion of Block 25, Tract No. 2 of
Encanto Heights, Map No. 1100
City of San Diego
PTS No. 520606

Applicant/Developer:
Rebecca Berry
5982 Gullstrand Street
San Diego, CA 92122
Contact: Abhay Schweitzer
(619) 940-5814

Snipes-Dye Associates
civil engineers and land surveyors

8348 Center Drive, Suite G
La Mesa, CA 91942-2910
(619) 697-9234, Fax (619) 460-2033
EO0571

Dated: June 4, 2018

DECLARATION OF RESPONSIBLE CHARGE

I, HEREBY DECLARE THAT I AM THE CIVIL ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITY FOR PROJECT DESIGN.



SON P. NGUYEN
R.C.E. 86249
EXP. 03-31-19

6/7/18
DATE



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PRELIMINARY HYDROLOGY AND HYDRAULIC CALCULATIONS
FOR
Federal Blvd. Marijuana Outlet
Conditional Permit Use

The project is located at 6176 Federal Blvd., in the City of San Diego with Assessor's Parcel No. 543-020-02-00. The project proposes the demolition of an existing single-story commercial building and the construction of a proposed medical marijuana outlet two-story building with a concrete paved driveway and permeable pavement parking spaces in the rear portion of the site. There will also be some right-of-way improvements that include the construction of a standard commercial 24-ft. concrete driveway and replacing an existing driveway with new curb and gutter and sidewalk.

PRE-DEVELOPMENT CONDITIONS: The existing site consists of a concrete paved lot with a single-story commercial building, shipping containers, steel sheds, and a trailer. The site topography consists mainly of flat land that mostly drains in a general northerly direction, except a portion of the site along the frontage of Federal Boulevard that drains into the street gutter system. The majority of the site drainage (denoted as Basin A in the Pre-Development Drainage Map) consists of sheet flow from the lot and the existing structures that flows northerly towards the rear of the site where it eventually makes its way into an existing trapezoidal channel that runs parallel to State Route Highway 94. The 100-yr peak flow rate from this drainage basin is approximately 0.57 cfs. The remaining portion of the site (Basin B) sheet flows onto the street gutter system on Federal Blvd. where it flows westerly into a curb inlet located approximately 60-ft. from the site, discharging into an existing 24" RCP public storm drainage system that eventually outlets at the aforementioned existing concrete lined channel south of Highway 94. Basin B discharges 0.06 cfs of runoff onto Federal Blvd. The total site drainage for the existing condition is 0.63 cfs for the 100-year storm event.

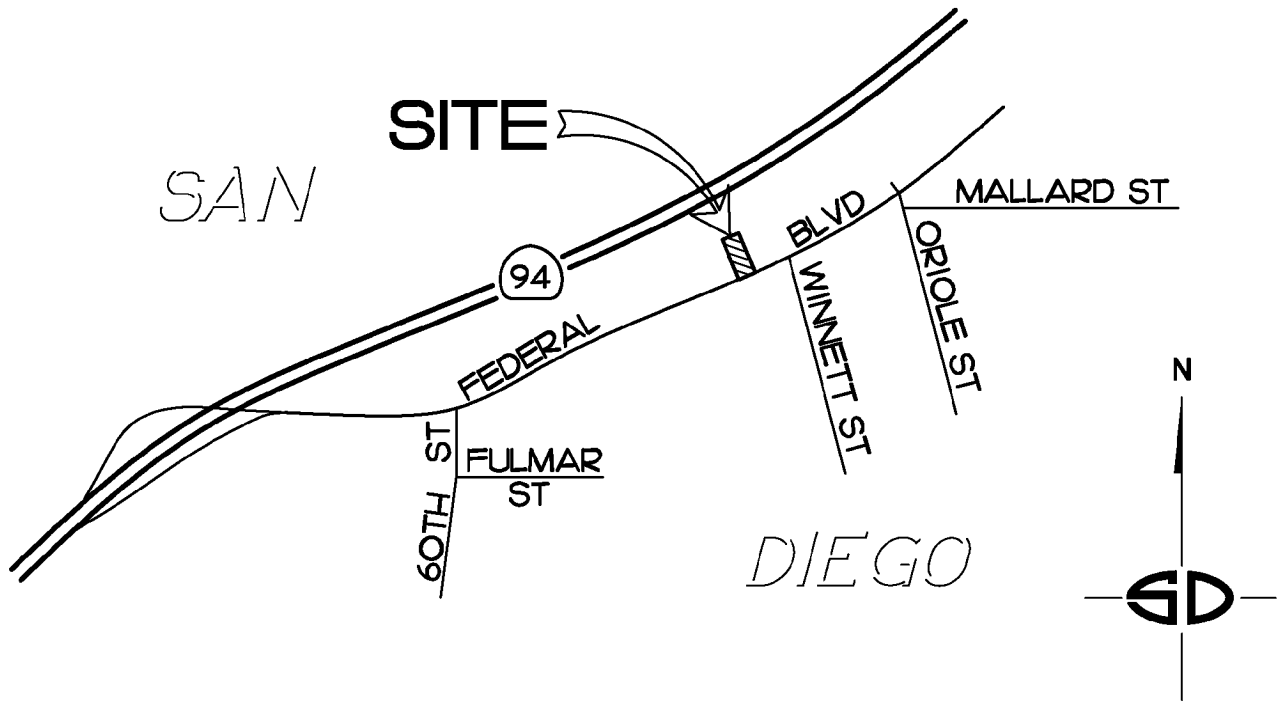
POST-DEVELOPMENT CONDITIONS: The proposed development consists of the construction of a new 2-story commercial building with parking spaces in the rear portion of the site that will be paved with permeable pavement. The site will also have a few landscape areas along the northerly boundary line and along the frontage of the property adjacent to Federal Boulevard. Drainage patterns for the proposed development will be similar to the current condition. Runoff from the proposed commercial building and main portion of the site (denoted as Basin A in the enclosed Post-Development Drainage Map) consists of surface 100-yr peak flow of approximately 0.49 cfs. A portion of the roof runoff from the proposed building will drain into the adjacent landscape area on the south, while some of the runoff will sheet flow onto the swale of the drive aisle area and directed northerly towards the rear portion of the site where it will exit through a curb opening at the same location as in the current condition. The front of the site (denoted as Basin B) will discharge 0.05 cfs onto Federal Blvd. gutter system and will enter the existing public 24" RCP storm drain system just west of the site. The total site peak discharge for the 100-year frequency is 0.54 cfs for the proposed development, a decrease of 0.12 cfs when compared to the pre-development condition.

The following table is a summary of the 100-year peak discharges for the pre- and post-development conditions:

PRE & POST DEVELOPMENT 100-YR. PEAK DISCHARGES						
BASIN ID	PRE-DEVELOPMENT			POST DEVELOPMENT		
	TIME OF CONCENTRATION T_c (IN MINUTES)	AREA A (IN ACRES)	DISCHARGE Q_{100} (IN CFS)	TIME OF CONCENTRATION T_c (IN MINUTES)	AREA A (IN ACRES)	DISCHARGE Q_{100} (IN CFS)
A	5.00	0.14	0.57	5.00	0.14	0.49
B	5.00	0.01	0.06	5.00	0.01	0.05

CONCLUSION:

- The peak 100-year discharge from the post-development will be less than the discharge in the pre-development mainly due to the reduced imperviousness of the site.
- There will be no negative impacts to downstream and/or adjacent properties due to the construction of the proposed development.
- The project site does not impact waters of the U.S., therefore it is not subject to CWA 401/404 regulations.



VICINITY MAP
NO SCALE

SOIL TYPE

6176 Federal Blvd., San Diego, CA 92114

ArcGIS ▾ BMP Sizing Calculator

Details Basemap

Share Print Measure 6176 Federal Blvd, San Diego, CA, 92114, USA

About Content Legend

Legend

BMP Sizing

- A
- B
- C
- D
- n/a



APPENDIX A: RATIONAL METHOD AND MODIFIED RATIONAL METHOD

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C) Soil Type ⁽¹⁾
Residential:	
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than 1/2 acre)	0.45
Commercial ⁽²⁾	
80% Impervious	0.85
Industrial ⁽²⁾	
90% Impervious	0.95

Note:

⁽¹⁾ Type D soil to be used for all areas.

⁽²⁾ Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%

Tabulated imperviousness = 80%

Revised C = $(50/80) \times 0.85 = 0.53$

The values in Table A-1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

Pre-Development

Basin	A	B
Actual imperviousness =	100%	94%
Tabulated imperviousness =	80%	80%
Revised C = $(50/80) \times 0.85$	1.06	1.00
Use	0.95	0.95

APPENDIX A: RATIONAL METHOD AND MODIFIED RATIONAL METHOD

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C) Soil Type ⁽¹⁾
Residential:	
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial ⁽²⁾	
80% Impervious	0.85
Industrial ⁽²⁾	
90% Impervious	0.95

Note:

⁽¹⁾ Type D soil to be used for all areas.

⁽²⁾ Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%

Tabulated imperviousness = 80%

Revised C = $(50/80) \times 0.85 = 0.53$

The values in Table A-1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

Post-Development

Basin	A	B
Actual imperviousness =	77%	79%
Tabulated imperviousness =	80%	80%
Revised C = $(50/80) \times 0.85$	0.82	0.84
Use	0.82	0.84

APPENDIX A: RATIONAL METHOD AND MODIFIED RATIONAL METHOD

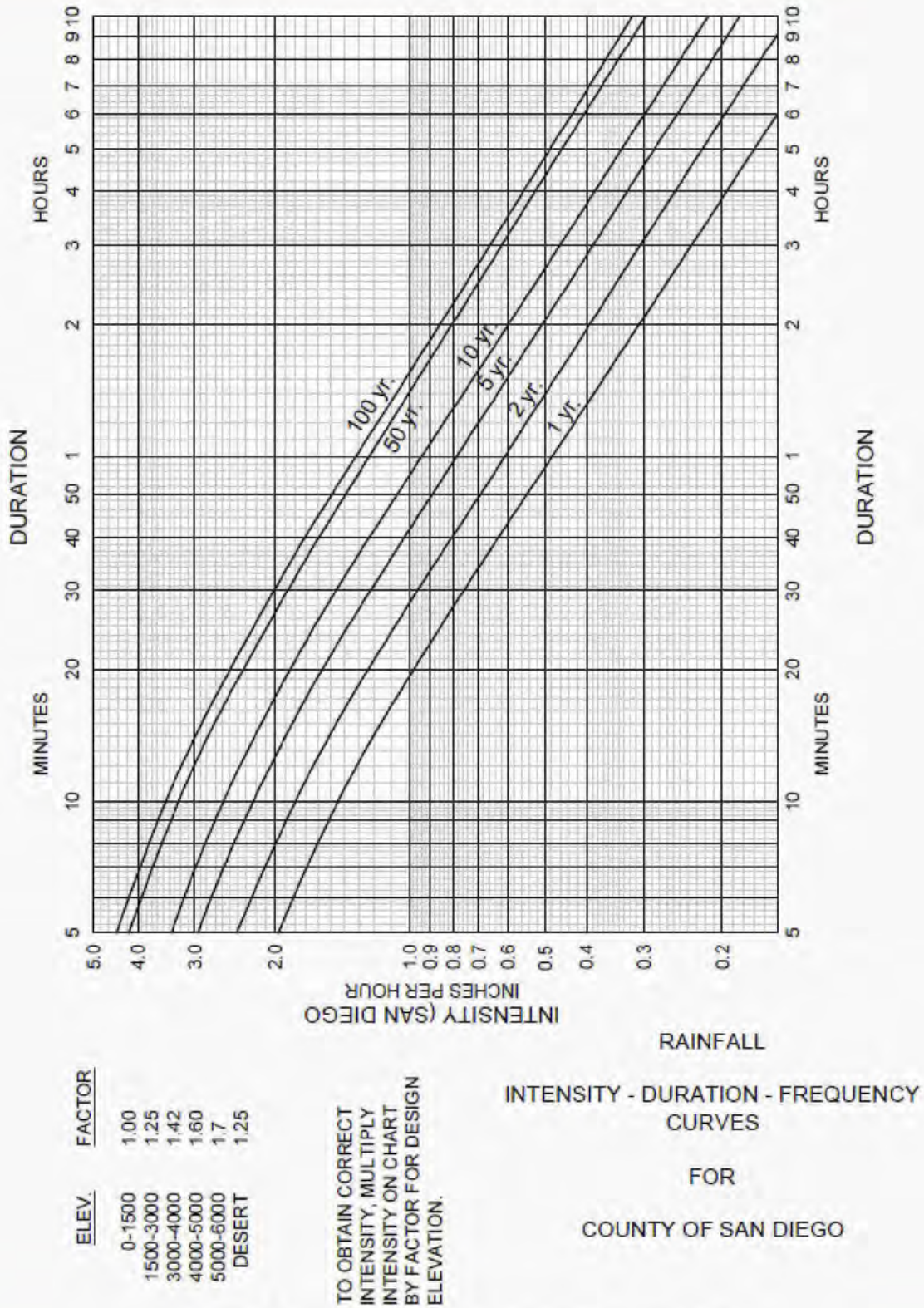


Figure A-1. Intensity-Duration-Frequency Design Chart



APPENDIX A: RATIONAL METHOD AND MODIFIED RATIONAL METHOD

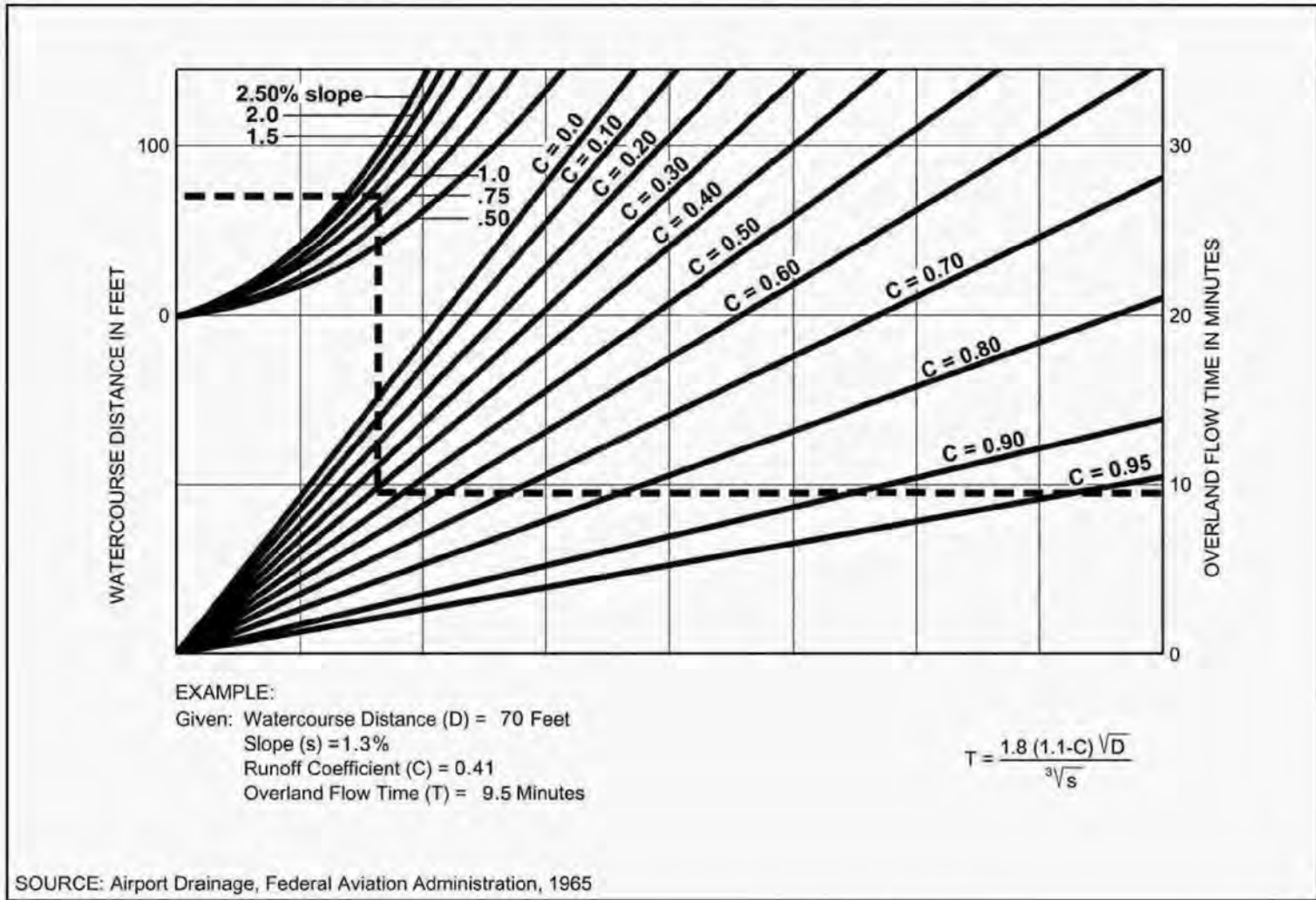
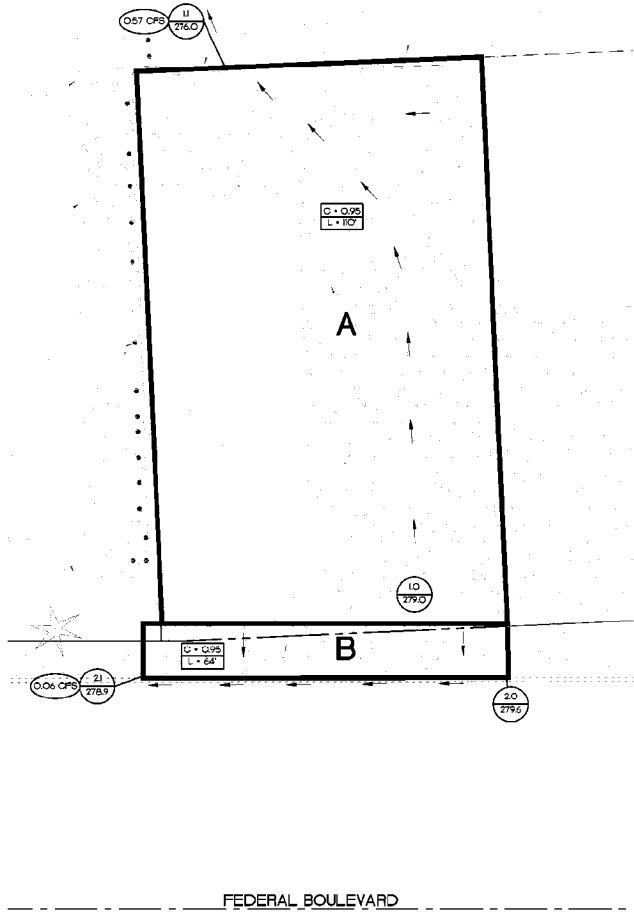


Figure A-4. Rational Formula - Overland Time of Flow Nomograph

Note: Use formula for watercourse distances in excess of 100 feet.

DRAINAGE MAPS

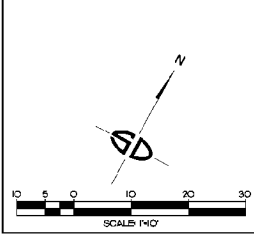


LEGEND

- BASIN ID NO. ----- A
- DRAINAGE BASIN BOUNDARY -----
- DIRECTION OF FLOW -----
- STUDY NODE W/ ELEVATION ----- (10 / 779.0)
- RUN OFF COEFFICIENT W/ FLOW LENGTH ----- (C = 0.95 / L = 100')
- 100-YR PEAK DISCHARGE ----- (0.57 CPS)

PRE & POST DEVELOPMENT 100-YR. PEAK DISCHARGES

BASIN ID	PRE-DEVELOPMENT			POST DEVELOPMENT		
	TIME OF CONCENTRATION T _c (IN MINUTES)	AREA A (IN ACRES)	DISCHARGE Q ₁₀₀ (IN CPS)	TIME OF CONCENTRATION T _c (IN MINUTES)	AREA A (IN ACRES)	DISCHARGE Q ₁₀₀ (IN CPS)
A	5.00	0.14	0.57	5.00	0.14	0.49
B	5.00	0.01	0.06	5.00	0.01	0.05



PRE-DEVELOPMENT DRAINAGE MAP

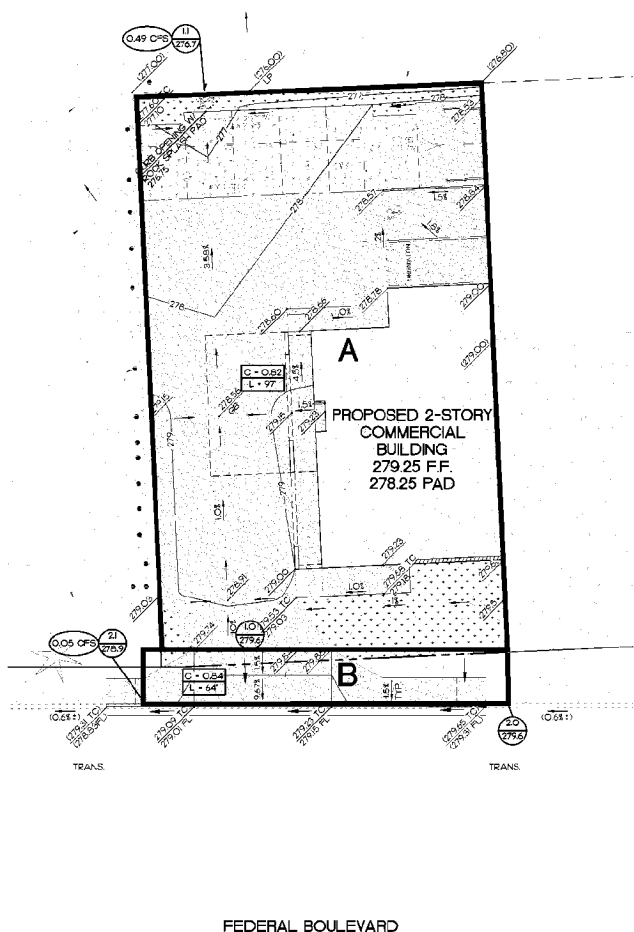
FEDERAL BLVD. MARIJUANA OUTLET
 8348 CENTER DRIVE, SUITE G, LA MESA, CA 91942-2910 (619) 697-9234, FAX (619) 460-2033

PROJECT NAME	DATE	BY	DATE
DESIGNED BY	DATE	CHECKED BY	DATE
DRAWN BY	DATE	DATE	DATE
DATE	DATE	DATE	DATE

SHEET 1 of 1

SD

FEDERAL BLVD. MARIJUANA OUTLET
 PRE-DEVELOPMENT DRAINAGE MAP



LEGEND

- BASIN ID NO. ----- A
- DRAINAGE BASIN BOUNDARY -----
- DIRECTION OF FLOW -----
- STUDY NODE W/ ELEVATION ----- $\begin{matrix} 20 \\ 279.6 \end{matrix}$
- RUN OFF COEFFICIENT W/ FLOW LENGTH ----- $\begin{matrix} C = 0.82 \\ L = 97 \end{matrix}$
- 100-YR PEAK DISCHARGE ----- 0.49 CFS

PRE & POST DEVELOPMENT 100-YR. PEAK DISCHARGES

BASIN ID	PRE-DEVELOPMENT			POST DEVELOPMENT		
	TIME OF CONCENTRATION Tc (IN MINUTES)	AREA A (IN ACRES)	DISCHARGE Q100 (IN CFS)	TIME OF CONCENTRATION Tc (IN MINUTES)	AREA A (IN ACRES)	DISCHARGE Q100 (IN CFS)
A	5.00	0.4	0.57	5.00	0.4	0.49
B	5.00	0.01	0.06	5.00	0.01	0.05

SNIPES-DYE ASSOCIATES 8348 CENTER DRIVE, SUITE G, LA MESA, CA 91942-2910 (619) 697-9234, FAX (619) 460-2033

SHEET	NO.	DATE	BY	CHECKED	DATE	BY	CHECKED	DATE	BY	CHECKED	DATE
1											

FEDERAL BLVD. MARIJUANA OUTLET
 POST-DEVELOPMENT DRAINAGE MAP

PRE-DEVELOPMENT DRAINAGE CALCULATIONS

THE PEAK 100-YEAR DISCHARGES (Q)

BASIN A: Q₁₀₀

COMBINED RUNOFF COEFFICIENT (C):

Land Use	Coefficient (C)	Tributary Area
Commercial	0.95	0.14 AC

City of San Diego Drainage Design Manual - January 2017 Edition
Table A-1: Runoff Coefficient for Rational Meth

C= Runoff Factor

= 0.95

RAINFALL INTENSITY (I):

ΔE = Change in elevation along the Effective Slope

= 3 Feet

D = Water Course Distance

= 110 Feet

S = Slope = ($\Delta E/D$) X 100%

= 2.73 %

T_c = Time of Concentration

$T_c = [1.8(1.1-C)(D^{1/2})]/[S^{1/3}] =$

= 2.03 Minutes

Use 5 Minutes

Urban Areas Overland Time of Flow Curves Pg. A-8
City of San Diego- Drainage Design Manual

Intensity = Intensity-Duration-Frequency Curves

= 4.40 Inches/Hour

City of San Diego- Drainage Design Manual Pg. A-4
Appendix I, Sheet 83

PEAK DISCHARGES (Q):

A = Area of the basin

= 0.14 Acres

Q = CIA

= 0.57 ft³/sec

THE PEAK 100-YEAR DISCHARGES (Q)

BASIN B: Q₁₀₀

COMBINED RUNOFF COEFFICIENT (C):

Land Use	Coefficient (C)	Tributary Area
Commercial	0.95	0.01 AC

City of San Diego Drainage Design Manual - January 2017 Edition
Table A-1: Runoff Coefficient for Rational Meth

C= Runoff Factor

= 0.95

RAINFALL INTENSITY (I):

ΔE = Change in elevation along the Effective Slope

= 0.64 Feet

D = Water Course Distance

= 64 Feet

S = Slope = ($\Delta E/D$) X 100%

= 1.00 %

T_c = Time of Concentration

$T_c = [1.8(1.1-C)(D^{1/2})]/[S^{1/3}] =$

= 2.16 Minutes

Use 5 Minutes

Urban Areas Overland Time of Flow Curves Pg. A-8
City of San Diego- Drainage Design Manual

Intensity = Intensity-Duration-Frequency Curves

= 4.40 Inches/Hour

City of San Diego- Drainage Design Manual Pg. A-4
Appendix I, Sheet 83

PEAK DISCHARGES (Q):

A = Area of the basin

= 0.01 Acres

Q = CIA

= 0.06 ft³/sec

POST-DEVELOPMENT DRAINAGE CALCULATIONS

THE PEAK 100-YEAR DISCHARGES (Q)

BASIN A: Q₁₀₀

COMBINED RUNOFF COEFFICIENT (C):

Land Use	Coefficient (C)	Tributary Area
Commerical	0.82	0.14 AC

City of San Diego Drainage Design Manual - January 2017 Edition
Table A-1: Runoff Coefficient for Rational Meth

C= Runoff Factor

= 0.82

RAINFALL INTENSITY (I):

ΔE = Change in elevation along the Effective Slope

= 2.92 Feet

D = Water Course Distance

= 97 Feet

S = Slope = ($\Delta E/D$) X 100%

= 3.01 %

T_c = Time of Concentration

$T_c = [1.8(1.1-C)(D^{1/2})]/[S^{1/3}] =$

= 3.44 Minutes

Use 5 Minutes

Urban Areas Overland Time of Flow Curves Pg. A-8
City of San Diego- Drainage Design Manual

Intensity = Intensity-Duration-Frequency Curves

= 4.40 Inches/Hour

City of San Diego- Drainage Design Manual Pg. A-4
Apendix I, Sheet 83

PEAK DISCHARGES (Q):

A = Area of the basin

= 0.14 Acres

Q = CIA

= 0.49 ft³/sec

THE PEAK 100-YEAR DISCHARGES (Q)

BASIN B: Q₁₀₀

COMBINED RUNOFF COEFFICIENT (C):

Land Use	Coefficient (C)	Tributary Area
Commercial	0.84	0.01 AC

City of San Diego Drainage Design Manual - January 2017 Edition
Table A-1: Runoff Coefficient for Rational Method

C= Runoff Factor

= 0.84

RAINFALL INTENSITY (I):

ΔE = Change in elevation along the Effective Slope

= 0.64 Feet

D = Water Course Distance

= 64 Feet

S = Slope = ($\Delta E/D$) X 100%

= 1.00 %

T_c = Time of Concentration

$T_c = [1.8(1.1-C)(D^{1/2})]/[S^{1/3}] =$

= 3.74 Minutes

Use 5 Minutes

Urban Areas Overland Time of Flow Curves Pg. A-8
City of San Diego- Drainage Design Manual

Intensity = Intensity-Duration-Frequency Curves

= 4.40 Inches/Hour

City of San Diego- Drainage Design Manual Pg. A-4
Appendix I, Sheet 83

PEAK DISCHARGES (Q):

A = Area of the basin

= 0.01 Acres

Q = CIA

= 0.05 ft³/sec