D & D ENGINEERING, INC.

Inglewood Basketball & Entertainment Center Project

LOW IMPACT DEVELOPMENT (LID) REPORT

August 23, 2018

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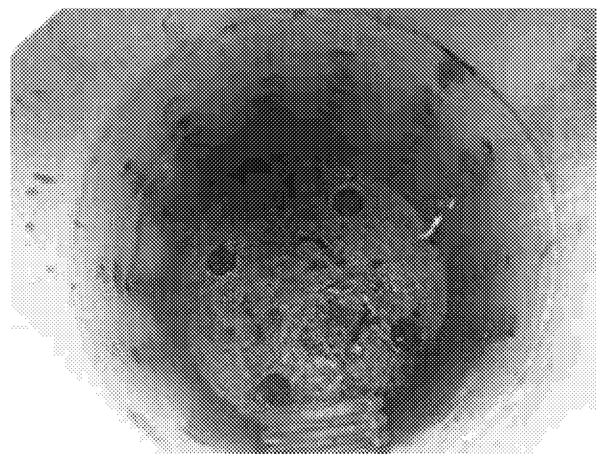

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I. Introduction

The purpose of this report is to outline and describe the proposed Low Impact Development (LID) strategies and Best Management Practices (BMPs) necessary to adequately reduce the hydrological and environmental impact of developing the proposed project, Project Condor, to comply with the requirements of LID Ordinance and LID Standard Manual[1]. Additionally, this report will determine the storm water quality design volume (SWQDv) calculated from the 85th percentile, 24-hour rain event that is required to be treated. Finally, this report will also discuss the methodology used to arrive at these conclusions, the infrastructure necessary to support it and the operations and maintenance procedures required to maintain the system effective over time.

II. Project Description

Project Condor is comprised of three sites located near the intersection of Century Boulevard and Doty Avenue in the city of Inglewood. The first and main project site is located to the southwest of the intersection the second parcel is located to the southeast of the intersection, and the third piece is southwest of Century and Prairie intersection. The first site of the proposed development includes a multi-purpose sport arena, a parking structure and other miscellaneous use buildings. The site is located on an approximately 17-acre site bound by Century Blvd. on the North, Prairie Avenue on the West, Doty Avenue on the East and 103th Street on the South. The second site includes proposed surface parking over an approximately 5-acre parcel, not contiguous to the main project site, just east of Doty Avenue. The third site includes proposed surface parking over an approximately 5.5 acre parcel, not contiguous to the main project site, just west of Prairie Avenue north and south of existing W 101st street. to the project vicinity map, *Figure 1 — Vicinity Map,* for project site location.

Project Condor is a mixed-use project that includes a multi-purpose sport arena with auxiliary structures including retail, office buildings, restaurants, parking structures and plaza areas. The project consists of 71,000 sq. ft. of office space, 25,000 sq. ft. of retail space, 15,000 sq. ft. of food services, 85,000 sq. ft. of practice facilities, 25,000 sq. ft. of Sports Medicine Clinic. 15,000 sq. ft. of Community Space, an 18,000-seat arena, a parking structure and substantial surface parking.

a. Existing Conditions

The existing site over the proposed main project site currently contains commercial buildings, a hotel, a fast-food restaurant and significant portions of vacant land. The existing site over the proposed surface parking site consists of five parcels that are currently all vacant. The existing site over the proposed surface parking west of Prairie Avenue site consists of thirty parcels that are currently all vacant.

Preliminary geotechnical investigations indicate that infiltration is infeasible for the site. The native soil characteristics are generally draining poorly and mostly heavily clayey or silty with an infiltration rate less than the LA County minimum for infiltration of 0.3 in/hr. Refer to the geotechnical report and recommendations, *Appendix A – Excerpt from Geotechnical Report,* for a summary of geotechnical findings.

b. Proposed Conditions

The proposed project seeks to develop the site into a mixed-use development composed of three general sites. The main site is considered the event area and includes a multi-purpose sports arena, retail/commercial buildings, a parking structure, and outdoor plaza. The east site proposes a parking structure, while the west site proposes surface

[1] (County of Los Angeles Department of Public Works, 2014)

parking lots. Due to these improvements, it is estimated that approximately 90% of the project site will be covered by impervious surfaces.

III. Low Impact Development (LID) Stormwater Quality Control Measures

The Low Impact Development (LID) plan is intended to mitigate the hydrological and environmental stresses imposed on the site due to its proposed development. As the site's development typically increases impervious level, so does the stormwater runoff volume and the amount of environmental pollutant it produces. The goal of the LID plan is to mitigate these factors by both reducing the volume of stormwater and potential pollutants in stormwater runoff to the most reasonable extent possible. This strategy may be accomplished by implementing a variety of Best Management Practices (BMPs) stormwater quality control measures designed to handle the frequent, smaller storm event, or the initial volume of stormwater run-off from a larger storm event (referred as first flush). This study will focus on and follow the procedures for selecting and implementing stormwater quality measures, as recommended in the Los Angeles County Department of Public Works (LACDPW) Low Impact Development Standards Manual.

a. Los Angeles County Design Guidelines

The focus of the design criteria for stormwater control measures is the construction and implementation of stormwater quality control measures that meet stormwater runoff requirements in terms of on-site retention and pollutant removal. The project must design and implement stormwater quality control measures that can handle the SWQDv. Any surplus storm run-off must be diverted around the stormwater quality control measures to prevent overloading. The Los Angeles County Department of Public Works Low Impact Development Standards Manual categorized stormwater control quality measures into the following types listed in level of priority:

1. Retention based BMPs (bioretention, infiltration basin, drywells, capture and reuse cisterns, green roof)
2. Biofiltration BMPs (biofiltration)
3. Vegetation-based BMPs (stormwater planters, vegetated swales, tree-well filter, etc.)
4. Treatment-based BMPs (Extended detention basin, constructed wetlands, wet pond, sand filters, proprietary devices)

Systems in a lower priority level may only be used if higher priority measures are deemed to be technically infeasible as set forth in the county's standards manual. Due to the properties of the native soils and the tendency to percolate well, this study will focus on retention-based BMPs.

b. Proposed Low Impact Development (LID) System

The proposed Low Impact Development (LID) system will utilize a combination of county standard bio-filtration planters and proprietary bio-filtration systems by Contech to treat the SWQDv from the 85th percentile, 24-hour storm. This will be accomplished through directing runoff from drainage areas to onsite bio-filtration planters and bio-swales currently proposed as part of the site hydrology study.

The proposed bio-filtration systems are designed to capture site runoff from roof drains, treat the runoff through biological reactions within the planter soil media, and discharge at a rate intended to mimic pre-developed conditions. Refer to the specific system configurations, *Figure 3 – Site Specific Bio-Filtration Details*, for bio-filtration system configurations at their given locations. Sizing and capacity analysis of the proposed conventional bio-filtration systems will be calculated by following the design guidelines defined through the State of California Los Angeles Regional Water Quality Control Board. It is anticipated that the city of Inglewood will apply directly to the water board for approval. Once approval is granted to the city of Inglewood, only city approval is required for continuation. In addition, county approval of the proprietary Contech Bio-Scape Filterra systems will be pursued for this project. The system has been previously approved within the county for several other jurisdictions, this LID plan will seek to receive approval for Filterra systems specifically for use within the city for Inglewood.

IV. Hydromodification Analysis

As outlined in Section 8.2 of the Los Angeles County Department of Public Works Low Impact Development Standards Manual, projects may be exempt from implementation of hydromodification control measures where assessments of downstream channel conditions and proposed discharge hydrology indicate that adverse hydromodification effects to beneficial uses of natural drainage systems are unlikely. Since the proposed project site will discharge through a storm drain system into the concrete Dominguez Channel, the project is exempt from Hydromodification Control Measures.

V. Site Design BMPs

a. Site Design

Current water quality requirements are based on treating a specific volume of stormwater run-off from the project site (SWQDv). The design storm from which the SWQDv is calculated is defined as the greater of:

- The 0.75-inch, 24-hour rain event, or
- The 85th percentile, 24-hour rain event as determine by the Los Angeles County 85th percentile precipitation isohyetal map

The volume of stormwater run-off that must be retained at a project site is calculated using MODRAT. In this case, the SQWDv volume from the 85th percentile, 24-hour rain event will be utilized. LACDPW developed a hydrologic calculator (HydroCalc) that completes the full MODRAT calculation process and produce the SWQDv volumes and flow rates for single subareas. This report will utilize the results from HydroCalc as a means of determining the stormwater quality design volumes (SWQDv). The proposed site was divided into drainage sub-areas, based on the proposed site grading and proposed drainage patterns. Refer to the Conceptual Low Impact Development Exhibit, *Figure 2 – Conceptual Low Impact Development (LID) Exhibit*, for the definition of the drainage sub areas. The following table, Table 1 - Post-Development Conditions, summarizes the results of the study and required treating volumes SWQDv for each subarea.

TABLE 1 - POST-DEVELOPMENT CONDITIONS AND BMP SUFFICIENCY SUMMARY

Project Condor

				BMP Sufficiency Summary			
Drainage Subarea	**Area (sf)**	**Q_{pm} (cfs)**	**SWQDv x 1.5 (cf)**	**Bio-Filtration System**	**Required (sf)**	**Provided (sf)**	**Sufficient**
DA-1	90,537	0.5852	9,671	Planter - Type B	3,868	4,605	Yes
DA-2	33,854	0.3040	3,627	Planter – Type B	1,451	2,332	Yes
DA-3	43,992	0.3936	4,697	Planter – Type B	1,879	3,032	Yes
DA-4	18,343	0.1558	1,953	Filterra	68	72	Yes
DA-5	39,116	0.3192	4,185	Filterra	143	144	Yes
DA-6	45,775	0.4325	4,883	Filterra	179	182	Yes
DA-7	41,333	0.2382	4,418	Filterra	130	144	Yes

DA-8	92,868	0.4714	9,903	Filterra	275	288	Yes
DA-9	25,185	0.1398	2,697	Filterra	78	91	Yes
DA-10	39,073	0.2951	4,185	Filterra	138	144	Yes
DA-11	12,631	0.0889	1,349	Filterra	43	48	Yes
RDA-1	17,696	0.1676	2,000	Planter – Type A	800	807	Yes
RDA-2	17,985	0.1595	2,000	Planter – Type A	800	807	Yes
RDA-3	6,815	0.0691	780	Planter – Type B	312	360	Yes
RDA-4A	154,674	0.9969	17,310	Planter – Type A	6,924	6,987	Yes
RDA-4B	154,692	1.0475	17,310	Planter – Type A	6,924	7,715	Yes
RDA-5	67,342	0.4834	7,559	Planter – Type A	3,023	3,026	Yes
RDA-6A	79,803	0.5883	8,924	Planter – Type A	3,569	3,569	Yes
RDA-6B	39,726	0.3384	4,437	Planter – Type A	1,775	1,964	Yes
RDA-6C	80,006	0.5915	8,972	Planter – Type A	3,589	3,589	Yes
Totals	***1,101446***	**7.8659**	***120,855***				

*Proposed proprietary Filterra bio-filtration system. See Appendix C for alternative design criteria calculations.

Refer to *Appendix B – Site Design Calculations for each subarea HydroCalc worksheets.*

Refer to *Appendix C – Sizing Calculations for each Bio-Filtration System calculation.*

b. BMP Selection

All roof drainage areas, as listed in the table above, discharge via roof drains to bio-filtration planters located on the surface. The remaining roof and drainage areas will be directed to a proprietary biofiltration system designed by Contech. Refer to the conceptual low Impact Development (LID) Exhibit, *Figure 2 – Conceptual Low Impact Development (LID) Exhibit*, for stormwater routing.

Refer to the calculation sheets in *Appendix C – Bio-Filtration Sizing Calculations*, for detailed calculations demonstrating the capacity of each proposed bio-filtration system.

VI. Summary and Conclusion

To summarize, the proposed low impact development (LID) system stormwater quality control measures and structural source measures are adequately designed and sized to accomplish the following:

- Capture and mitigate the SQWDv volume from the 85th percentile, 24-hour storm;
- Bio-filtration of captured volume by bio-filtration through a combination of standard bio-filtration planters and proprietary bio-filtration systems.
- Prevent pollutants from contacting stormwater run-off and/or prevent discharge of contaminated stormwater run-off to stormdrain system

Based on the calculations and conclusions presented in this report, the proposed LID stormwater quality control measures will retain on-site through bio-filtration and will mitigate the required SWQDv volumes as defined by the Los Angeles County Department of Public Works Low Impact Development Standards Manual.

VII. References

County of Los Angeles Department of Public Works. (2014). *Low Impact Development Standards Manual*. Los Angeles.

FIGURES

Figure 1 — Vicinity Map

Figure 2 — Conceptual Low Impact Development (LID)

Figure 3 — Site Specific Bio-Filtration Details

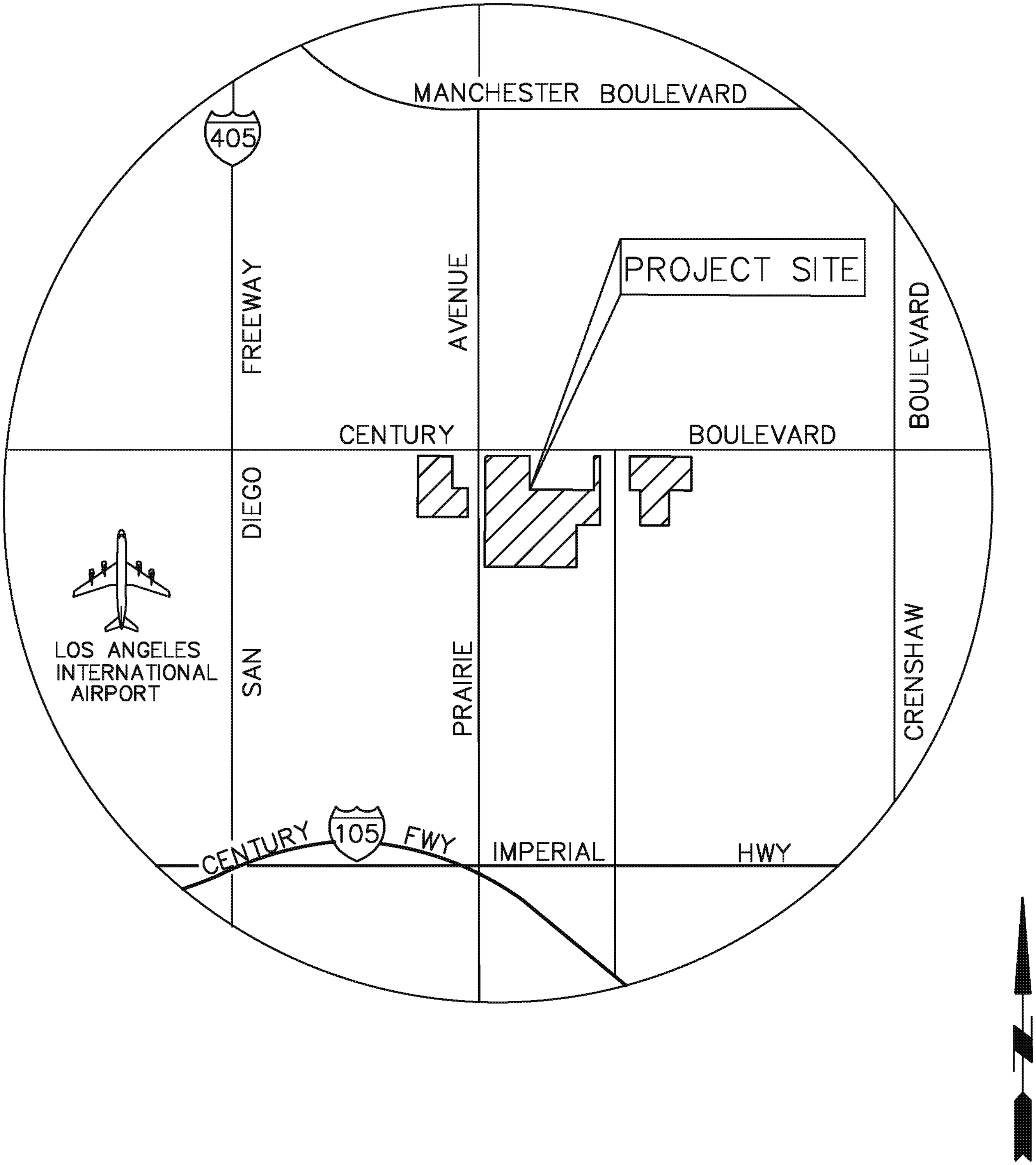

FIGURE 1

D & D ENGINEERING, INC. 8901 S. LA CIENEGA BLVD, SUITE 106 INGLEWOOD, CA 90301 Phone: 424-393-4122	PROJECT CONDOR	SCALE: AS SHOWN
		DATE: 07/31/2018
	VICINITY MAP	SHT NO.: 01 OF 01

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LEGEND

	DRAINAGE AREA
	ROOF DRAINAGE AREA
	BIO-FILTRATION PLANTERS TYPE A
	BIO-FILTRATION PLANTERS TYPE B
	FILTERRA BIOFILTRATION SYSTEM
P1	PLANTER AREAS
F1	FILTERRA AREAS

LOW IMPACT DEVELOPMENT NOTES:

1. INFILTRATION DEEMED TECHNICALLY INFEASIBLE PER GEOTECHNICAL INVESTIGATIONS.
2. BIO-FILTRATION BMPs ARE SUGGESTED AS THE PROPOSED LID MEASURE PER LOS ANGELES COUNTY GUIDELINES.
3. LOCATION, FOOTPRINT AND TYPE OF BIO-FILTRATION SYSTEM SHOW ON PLAN IS CONCEPTUAL AND FOR COORDINATION PURPOSES ONLY.

60 0 60 120
scale 1" = 60' feet

AECOM

PROJECT

PROJECT CONDOR, INGLEWOOD CALIFORNIA

CLIPPERS ARENA INGLEWOOD

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Santa Ynez, CA 93460
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REGISTRATION

NOT FOR CONSTRUCTION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
	AUG 29, 2018	CONCEPT DESIGN REVIEW

KEY PLAN

N
TRUE NORTH

PROJECT NUMBER

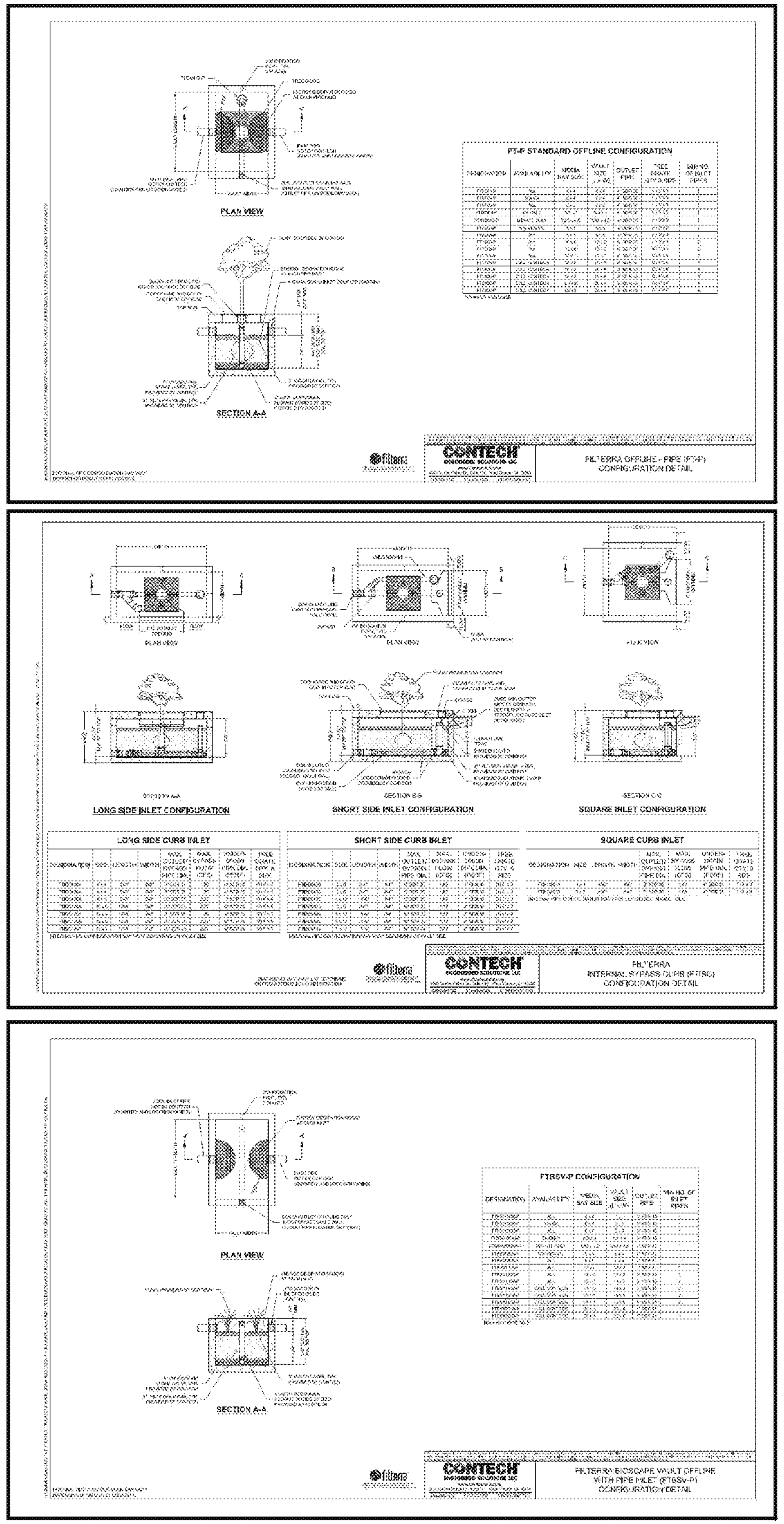
60545923

SHEET TITLE

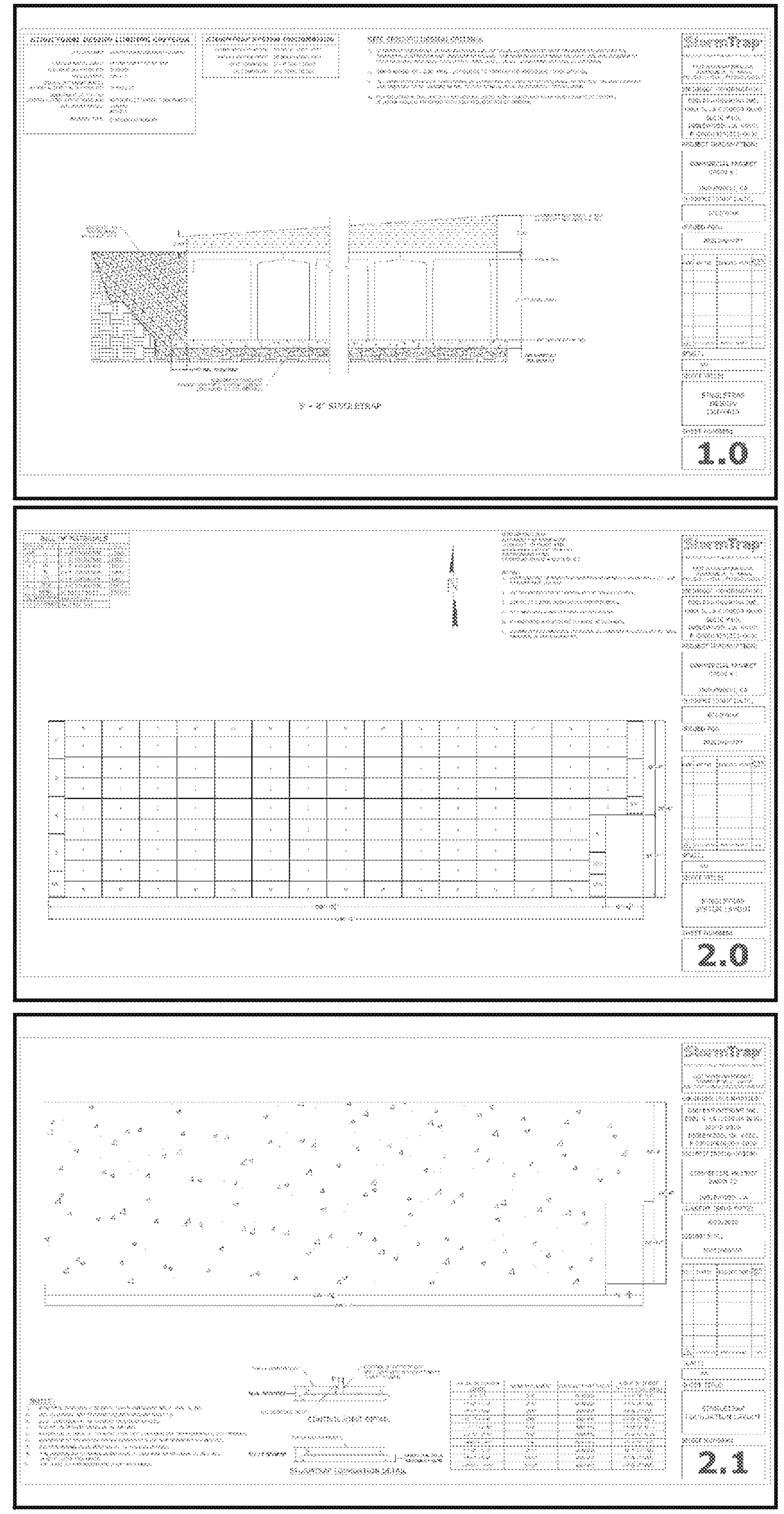
Preliminary Low Impact Development (LID) Plan

SHEET NUMBER

C-302A



1 FILTERRA BIO-FILTRATION DETAILS



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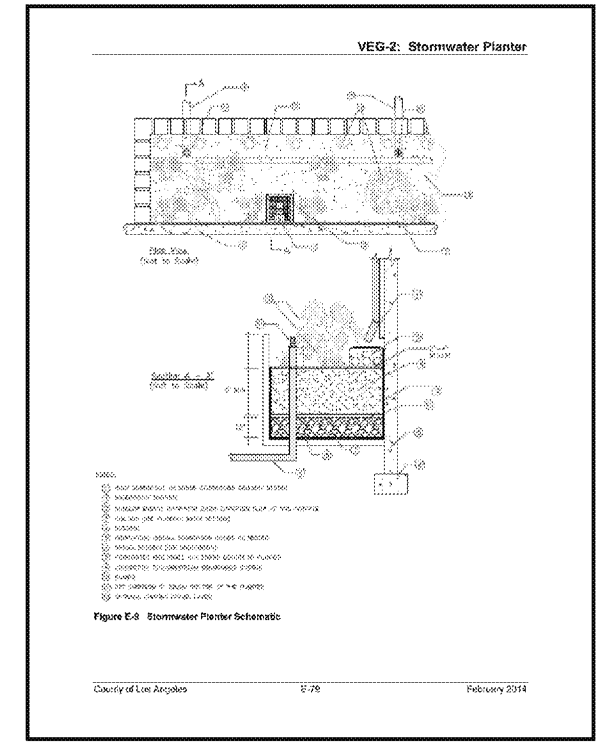
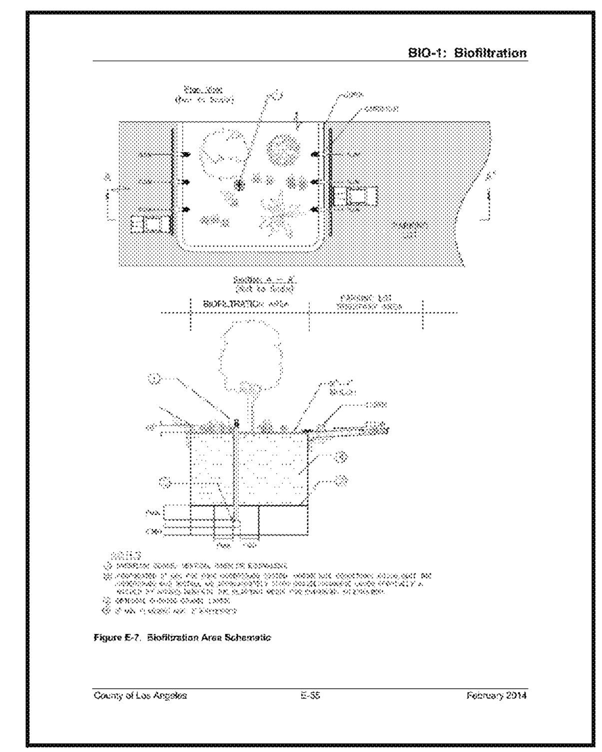


3 BIO-FILTRATION PLANTER - TYPE A



4 BIO-FILTRATION PLANTER - TYPE B

FIGURE 3

D & D ENGINEERING, INC. 8901 S. LA CIENEGA BLVD, SUITE 106 INGLEWOOD, CA 90301 Phone: 424-393-4122	CONDOR SITE SPECIFIC BIO-FILTRATION DETAILS	SCALE: AS SHOWN DATE: 07/31/2018 SHT NO.: 01 OF 01

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Appendix A

Excerpt from Geotechnical Report

5.11.1 Flexible Pavement Thicknesses

The following flexible pavement thicknesses for Traffic Index (TI) values of 5, 6 and 7 may be used:

Table 8 – Minimum Flexible (AC) Pavement Thicknesses

	Pavement Section (feet)	
Traffic Index (TI)	Asphaltic Concrete	Aggregate Base
4 to 5	0.3	0.55
6 to 7	0.4	0.65
7 to 8	0.5	0.75

5.11.2 Concrete Flatwork / Hardscape and Sidewalks

For PCC pavements in pedestrian areas, a pavement section of 4 inches PCC over 6 inches of aggregate base is typical for the kinds of soils to be expected at the site.

It should be noted that the above recommendations apply to parking lot, driveway and street areas only. Loading docks and trash enclosures should be paved with PCC pavement. We recommend that the section consist of a minimum of 6 inches of reinforced Portland cement concrete over 4 inches of Caltrans Class 2 Base with a minimum R-value of 78. The aggregate base should be compacted to at least 95 percent of the maximum dry density per ASTM D-1557 over unyielding subgrade.

5.12 INFILTRATION FEASIBILITY

Preliminary percolation tests were conducted at five (5) selected locations at the site (P-1 through P-5). The results of percolation testing are summarized in Appendix D.

Based on the results, infiltration rates for the soils in the upper 10 feet ranged from 0.32 to 3.52 in/hr. The test results represent a sampling of the upper materials which consist of variable and predominately clayey and silty sands. The upper value may be due to localized presence of more granular soils at the particular test location (P-2).

However, as discussed in this report, the subsurface native soils at the site consist predominately of clayey soils with estimated infiltration rates lower than 0.3 in/hr and with few or no connectivity to permeable soil horizons of adequate thickness. Moreover, the underlying, predominately clayey soils have never experienced saturation and have been found to exhibit more compressibility when inundated; therefore any infiltration of water into the subsurface soils, particularly within the areas to be occupied by permanent structures, is highly discouraged from a foundation performance stand-point. Given these constraints, infiltration practices might not be feasible at the site.

Appendix B

Post-Development Hydrological Conditions

Peak Flow Hydrologic Analysis

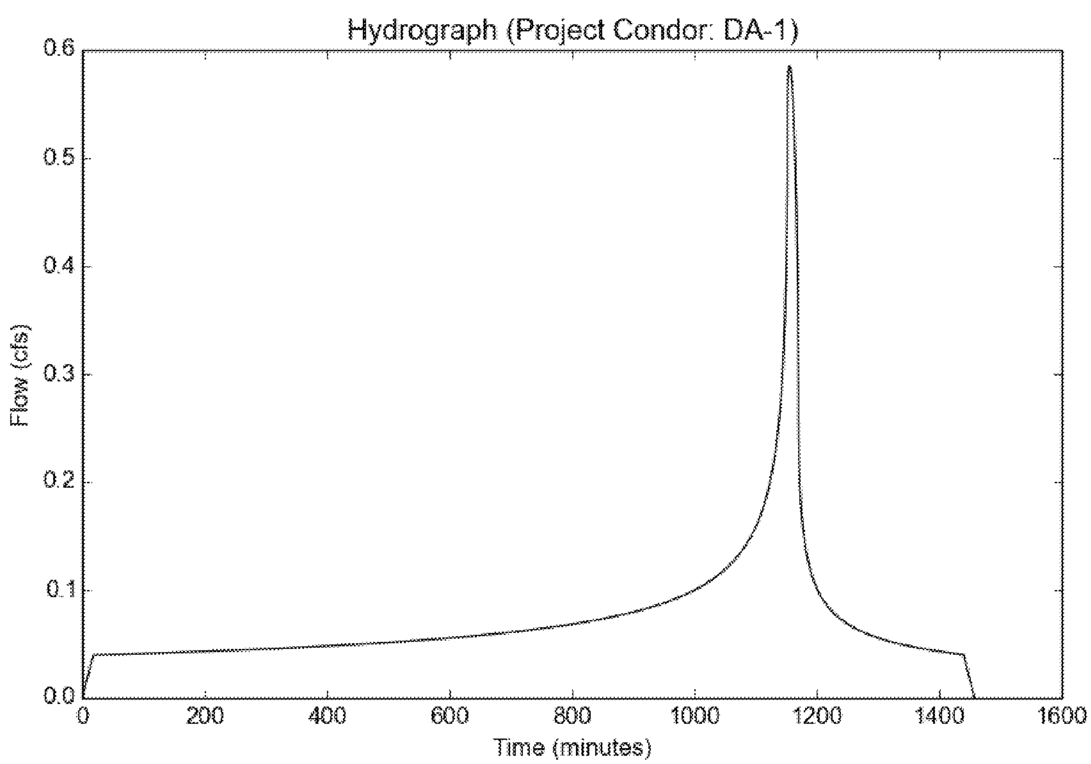
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	DA-1
Area (ac)	2.08
Flow Path Length (ft)	315.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.3431
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	18.0
Clear Peak Flow Rate (cfs)	0.5852
Burned Peak Flow Rate (cfs)	0.5852
24-Hr Clear Runoff Volume (ac-ft)	0.148
24-Hr Clear Runoff Volume (cu-ft)	6447.1944



Peak Flow Hydrologic Analysis

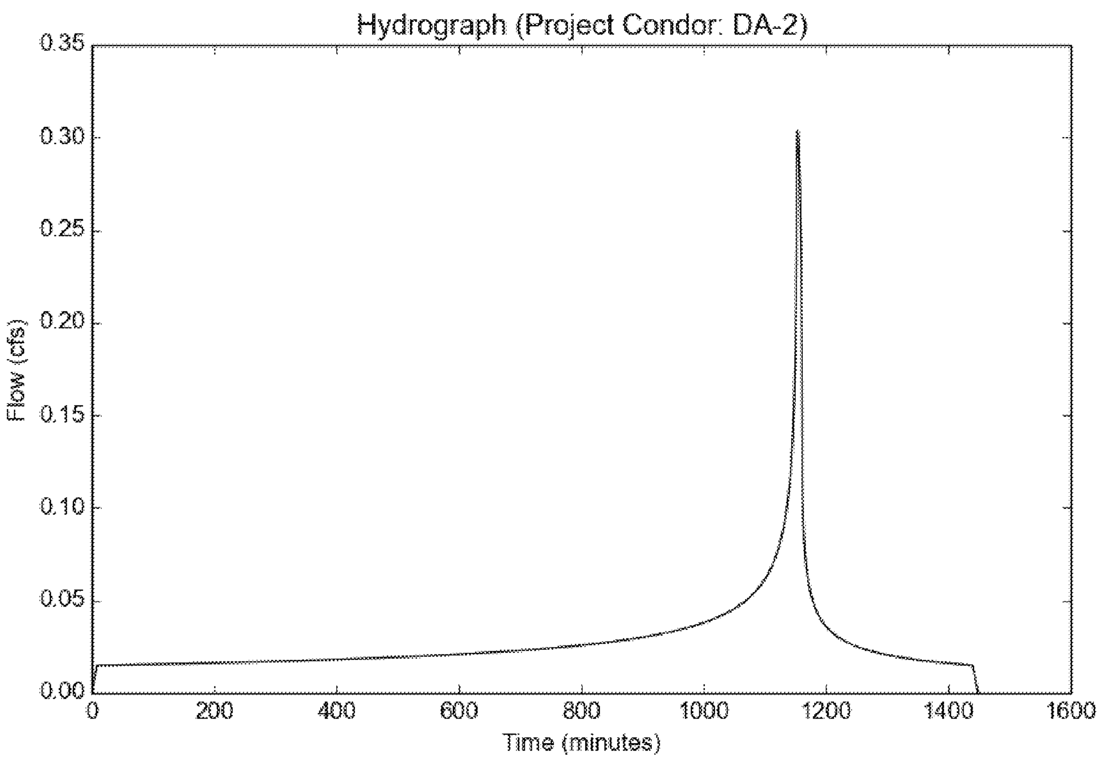
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	DA-2
Area (ac)	0.78
Flow Path Length (ft)	100.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.4752
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	0.304
Burned Peak Flow Rate (cfs)	0.304
24-Hr Clear Runoff Volume (ac-ft)	0.0555
24-Hr Clear Runoff Volume (cu-ft)	2417.6905



Peak Flow Hydrologic Analysis

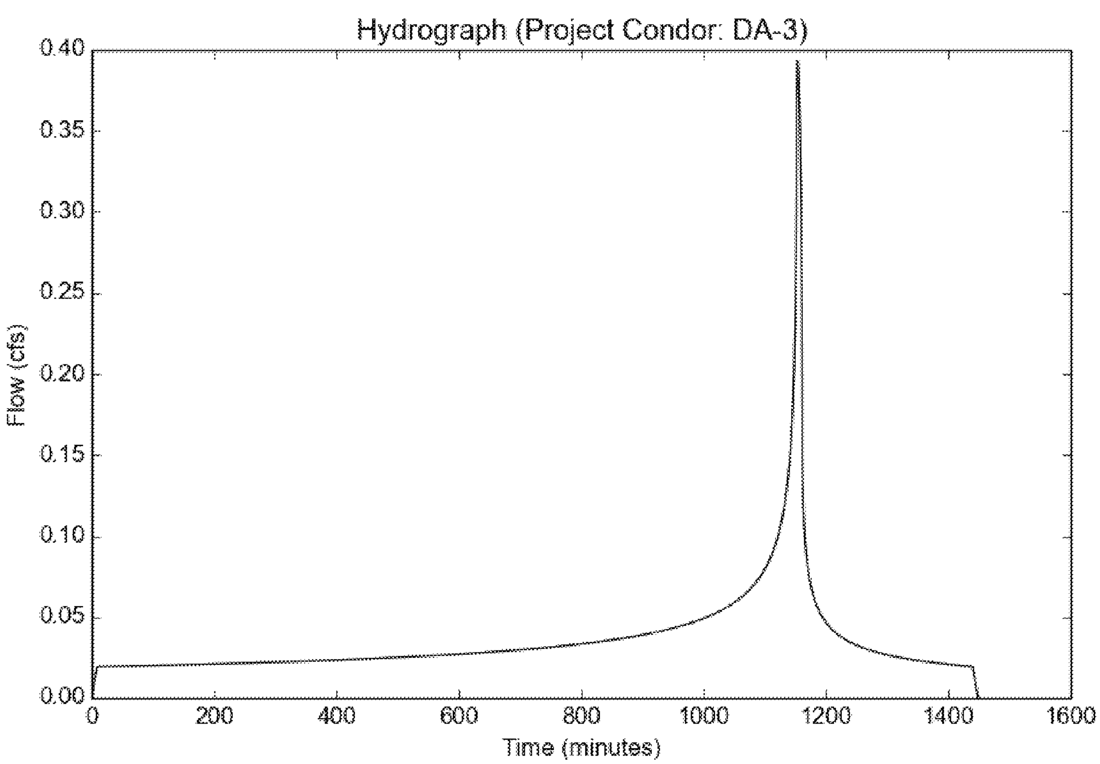
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	DA-3
Area (ac)	1.01
Flow Path Length (ft)	110.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.4752
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	0.3936
Burned Peak Flow Rate (cfs)	0.3936
24-Hr Clear Runoff Volume (ac-ft)	0.0719
24-Hr Clear Runoff Volume (cu-ft)	3130.5992



Peak Flow Hydrologic Analysis

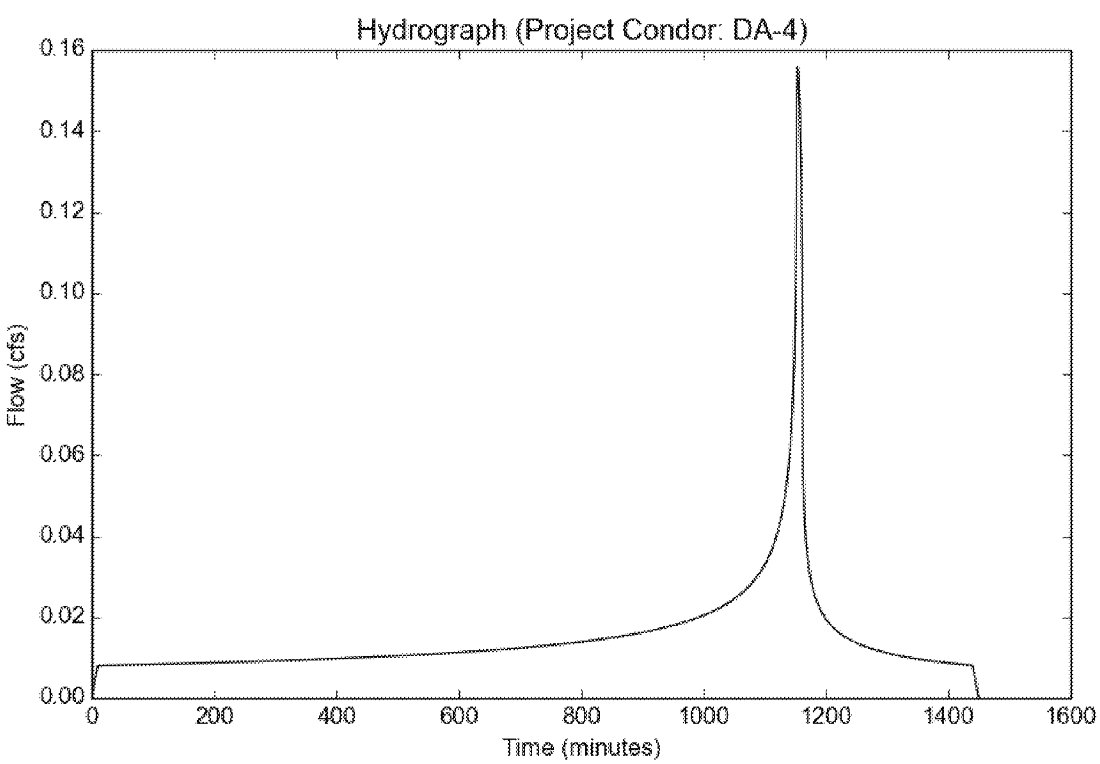
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	DA-4
Area (ac)	0.42
Flow Path Length (ft)	120.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.4523
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	0.1558
Burned Peak Flow Rate (cfs)	0.1558
24-Hr Clear Runoff Volume (ac-ft)	0.0299
24-Hr Clear Runoff Volume (cu-ft)	1301.8336



Peak Flow Hydrologic Analysis

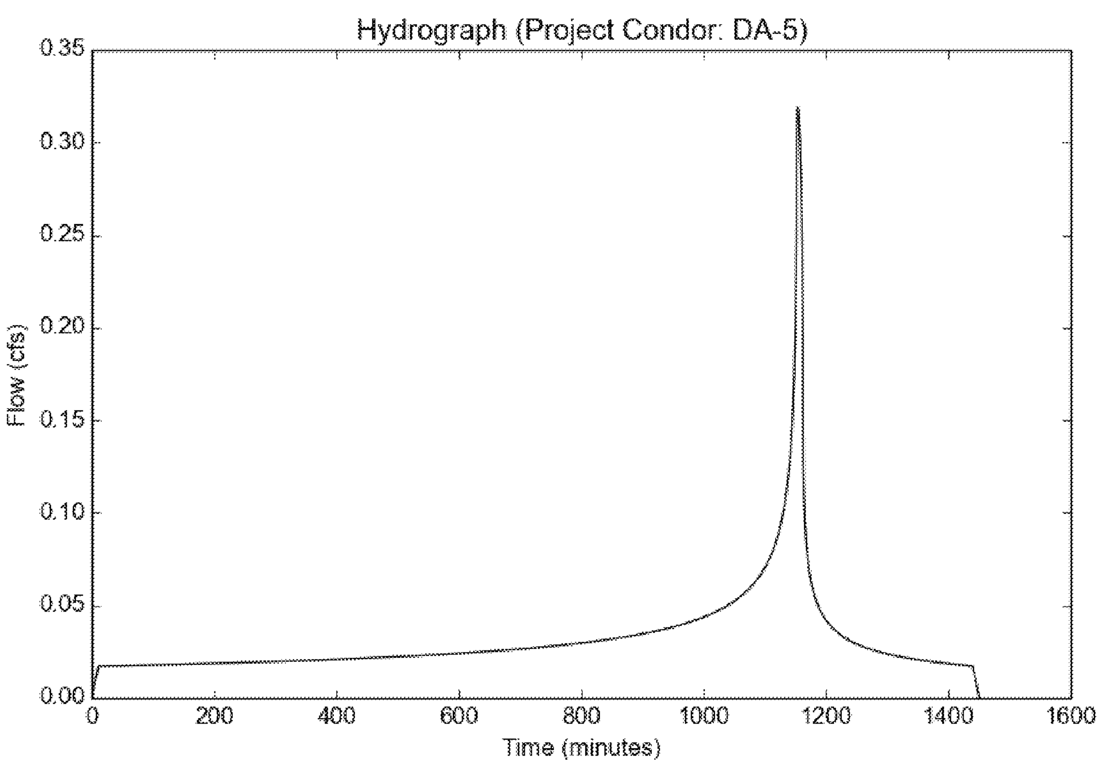
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	DA-5
Area (ac)	0.9
Flow Path Length (ft)	140.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.4325
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	0.3192
Burned Peak Flow Rate (cfs)	0.3192
24-Hr Clear Runoff Volume (ac-ft)	0.064
24-Hr Clear Runoff Volume (cu-ft)	2789.6443



Peak Flow Hydrologic Analysis

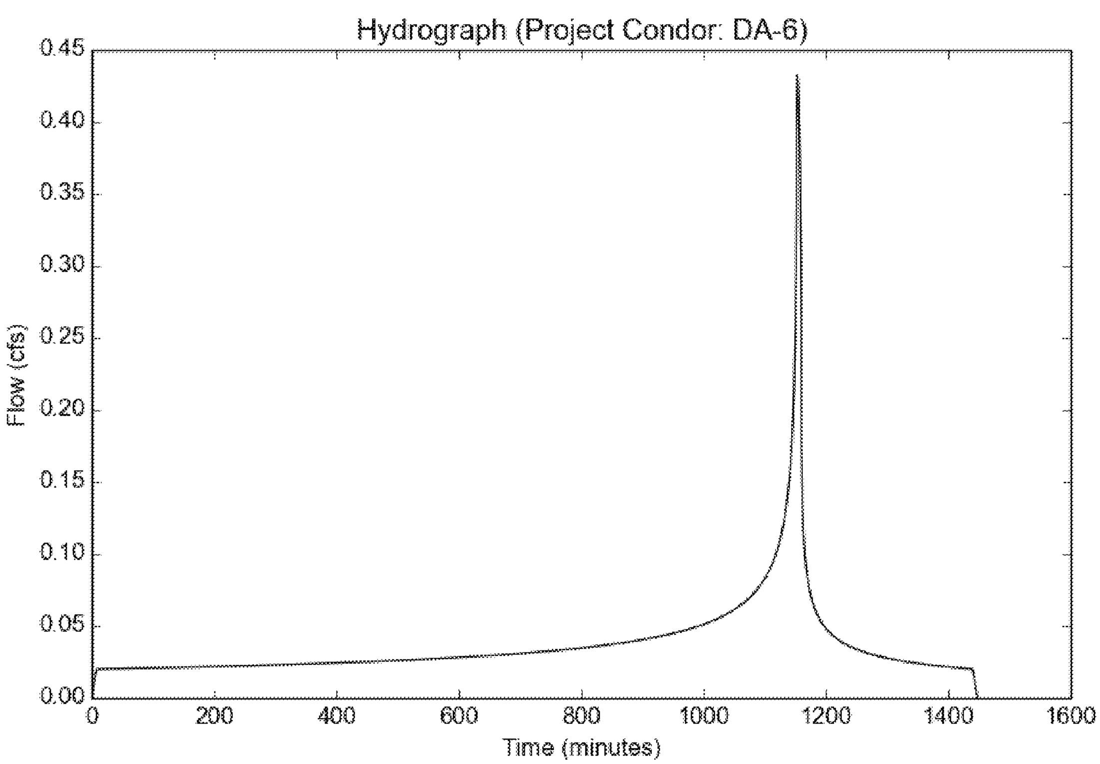
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	DA-6
Area (ac)	1.05
Flow Path Length (ft)	90.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.5023
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	0.4325
Burned Peak Flow Rate (cfs)	0.4325
24-Hr Clear Runoff Volume (ac-ft)	0.0747
24-Hr Clear Runoff Volume (cu-ft)	3254.5826



Peak Flow Hydrologic Analysis

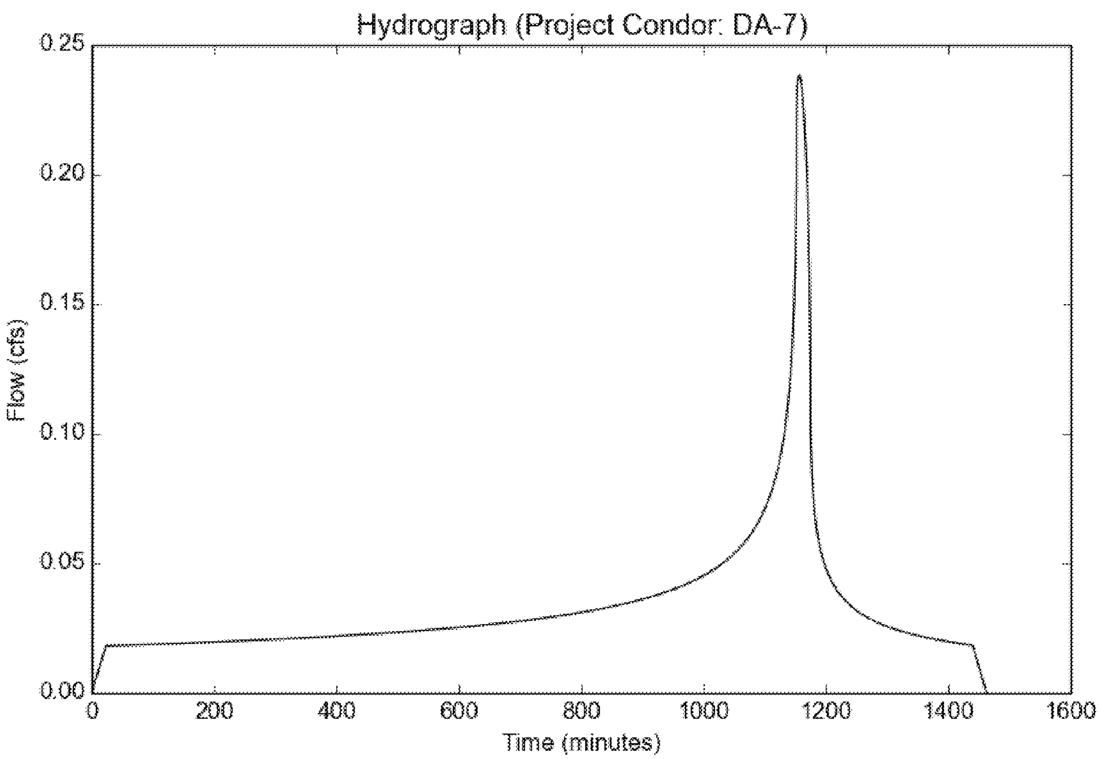
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	DA-7
Area (ac)	0.95
Flow Path Length (ft)	450.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.3058
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	23.0
Clear Peak Flow Rate (cfs)	0.2382
Burned Peak Flow Rate (cfs)	0.2382
24-Hr Clear Runoff Volume (ac-ft)	0.0676
24-Hr Clear Runoff Volume (cu-ft)	2944.6398



Peak Flow Hydrologic Analysis

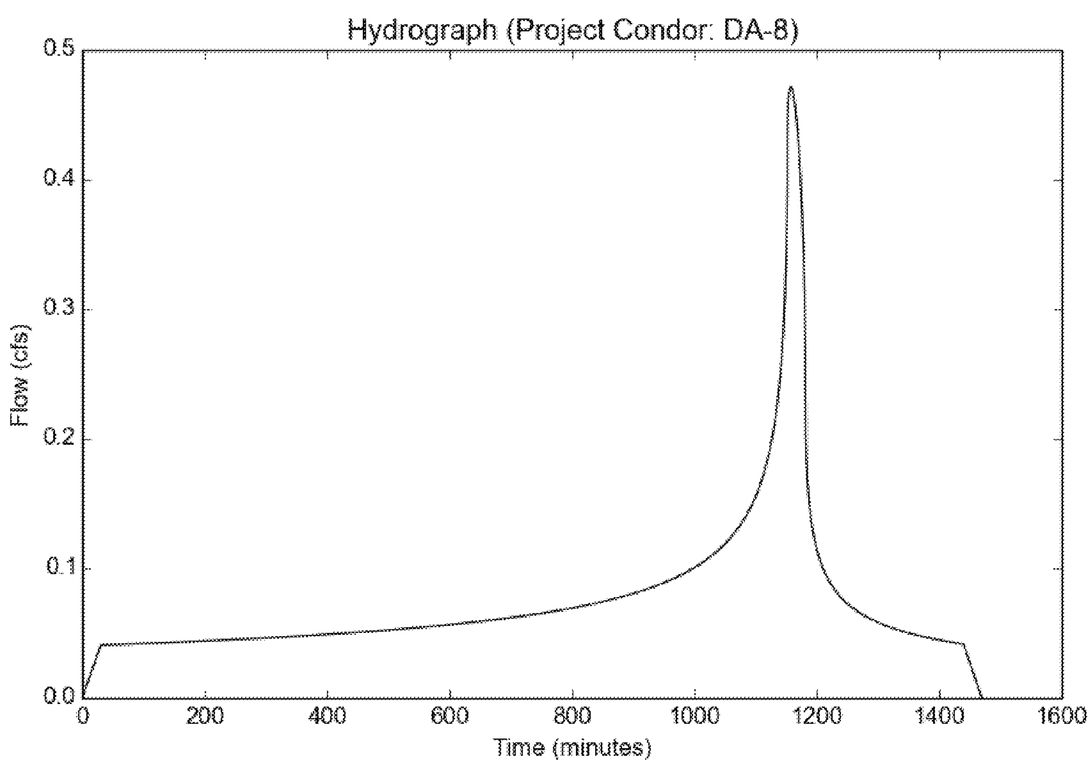
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	DA-8
Area (ac)	2.13
Flow Path Length (ft)	700.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.2699
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	30.0
Clear Peak Flow Rate (cfs)	0.4714
Burned Peak Flow Rate (cfs)	0.4714
24-Hr Clear Runoff Volume (ac-ft)	0.1516
24-Hr Clear Runoff Volume (cu-ft)	6602.2238



Peak Flow Hydrologic Analysis

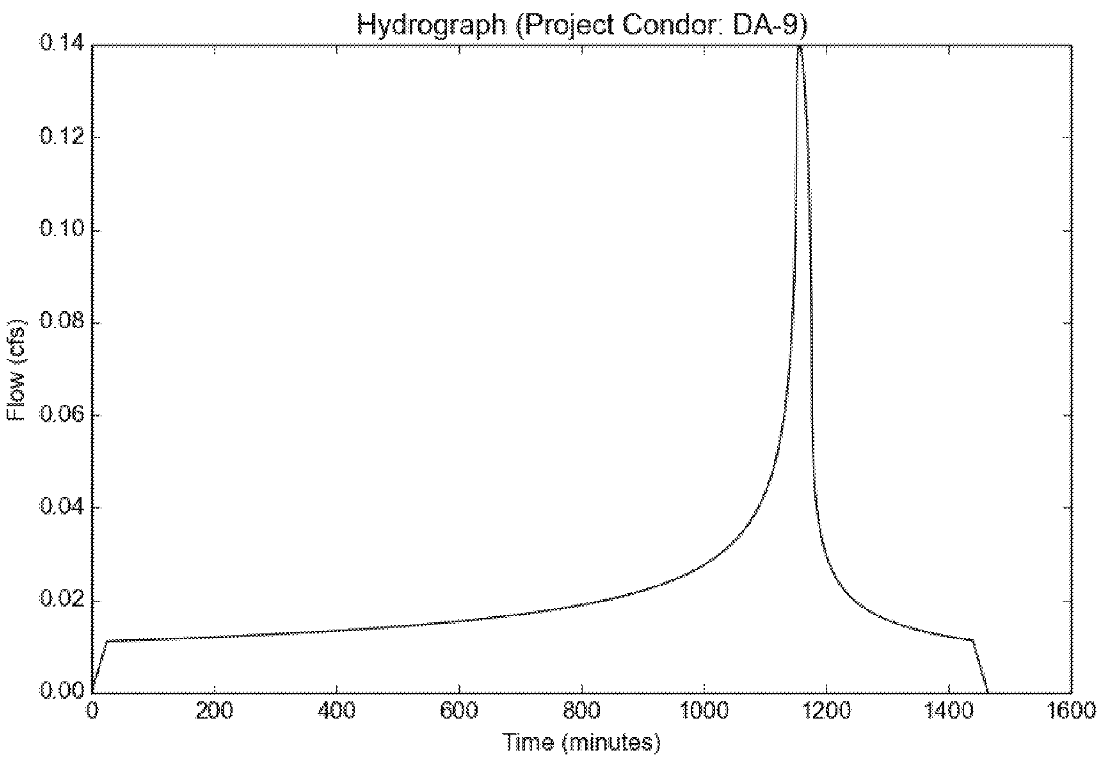
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	DA-9
Area (ac)	0.58
Flow Path Length (ft)	530.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.294
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	25.0
Clear Peak Flow Rate (cfs)	0.1398
Burned Peak Flow Rate (cfs)	0.1398
24-Hr Clear Runoff Volume (ac-ft)	0.0413
24-Hr Clear Runoff Volume (cu-ft)	1797.7823



Peak Flow Hydrologic Analysis

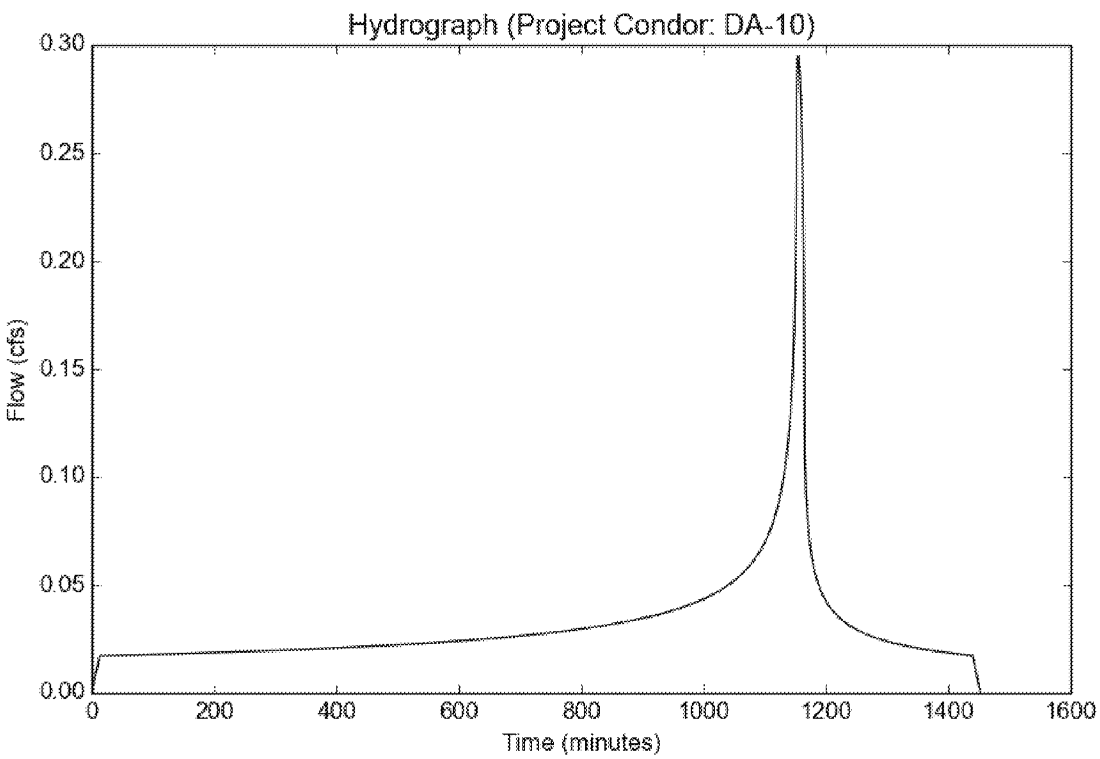
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	DA-10
Area (ac)	0.9
Flow Path Length (ft)	200.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.3998
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	0.2951
Burned Peak Flow Rate (cfs)	0.2951
24-Hr Clear Runoff Volume (ac-ft)	0.064
24-Hr Clear Runoff Volume (cu-ft)	2789.6459



Peak Flow Hydrologic Analysis

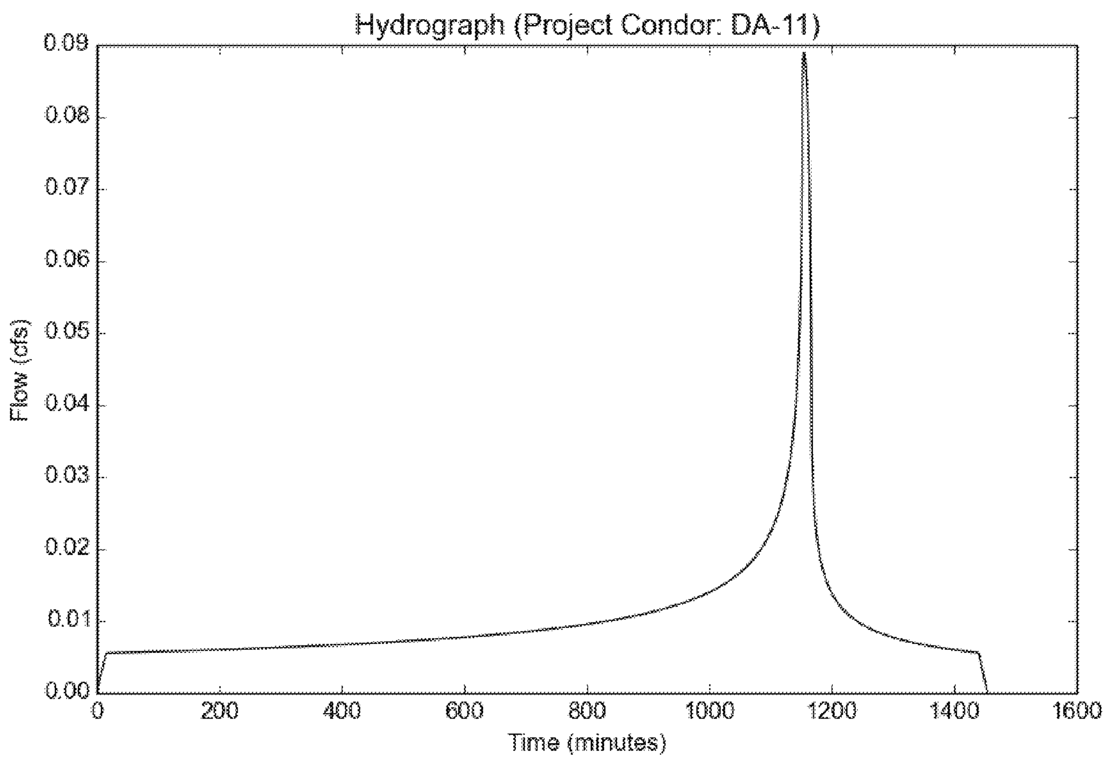
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	DA-11
Area (ac)	0.29
Flow Path Length (ft)	240.0
Flow Path Slope (vft/hft)	0.01
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.9
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.3738
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.82
Time of Concentration (min)	15.0
Clear Peak Flow Rate (cfs)	0.0889
Burned Peak Flow Rate (cfs)	0.0889
24-Hr Clear Runoff Volume (ac-ft)	0.0206
24-Hr Clear Runoff Volume (cu-ft)	898.8866



Peak Flow Hydrologic Analysis

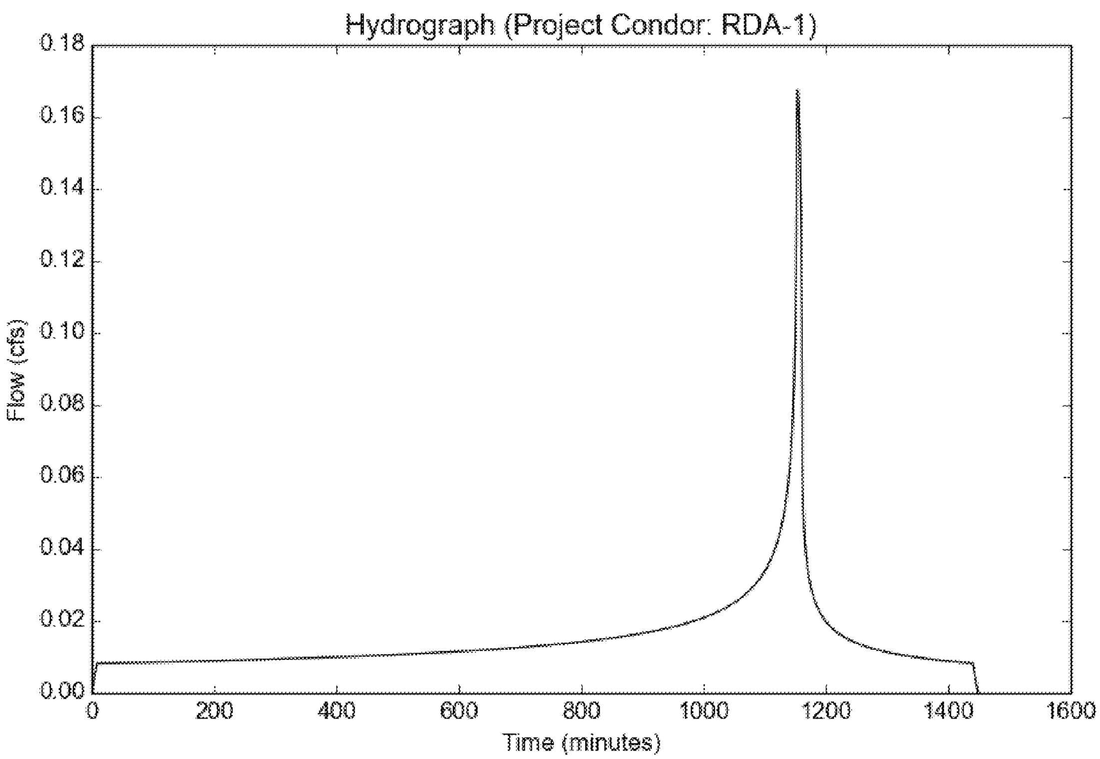
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	RDA-1
Area (ac)	0.41
Flow Path Length (ft)	130.0
Flow Path Slope (vft/hft)	0.02
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.95
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.4752
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	0.1676
Burned Peak Flow Rate (cfs)	0.1676
24-Hr Clear Runoff Volume (ac-ft)	0.0306
24-Hr Clear Runoff Volume (cu-ft)	1332.8294



Peak Flow Hydrologic Analysis

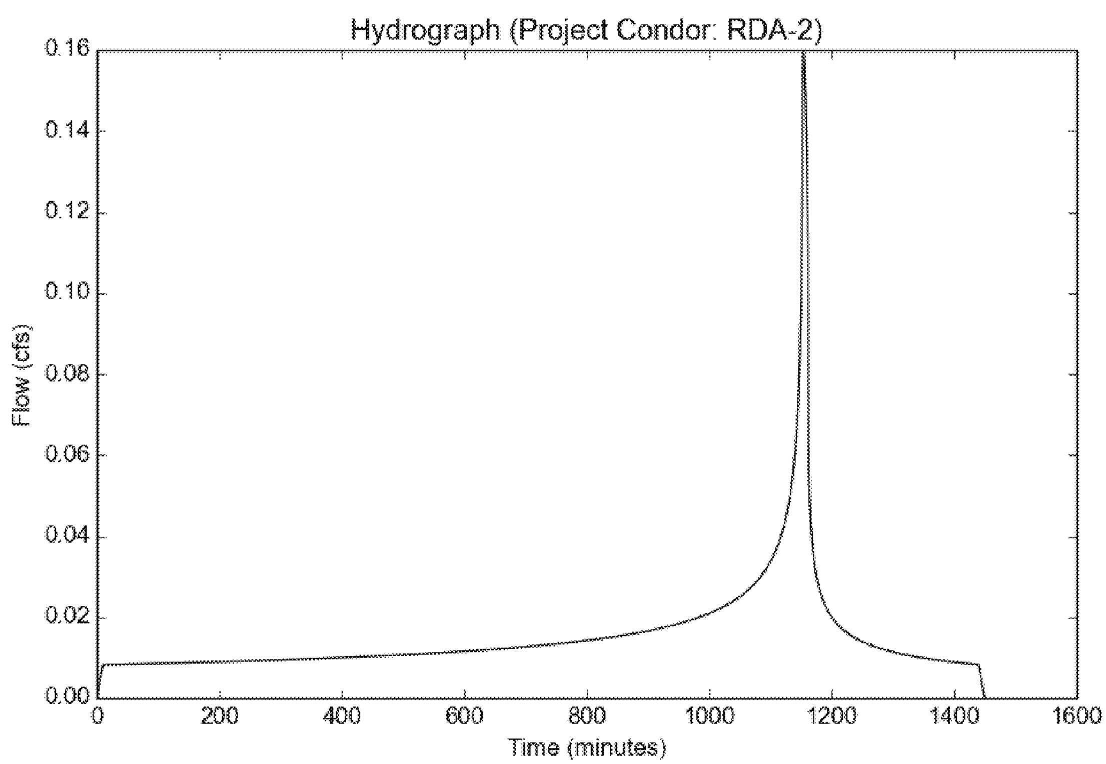
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	RDA-2
Area (ac)	0.41
Flow Path Length (ft)	160.0
Flow Path Slope (vft/hft)	0.02
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.95
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.4523
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	0.1595
Burned Peak Flow Rate (cfs)	0.1595
24-Hr Clear Runoff Volume (ac-ft)	0.0306
24-Hr Clear Runoff Volume (cu-ft)	1332.8297



Peak Flow Hydrologic Analysis

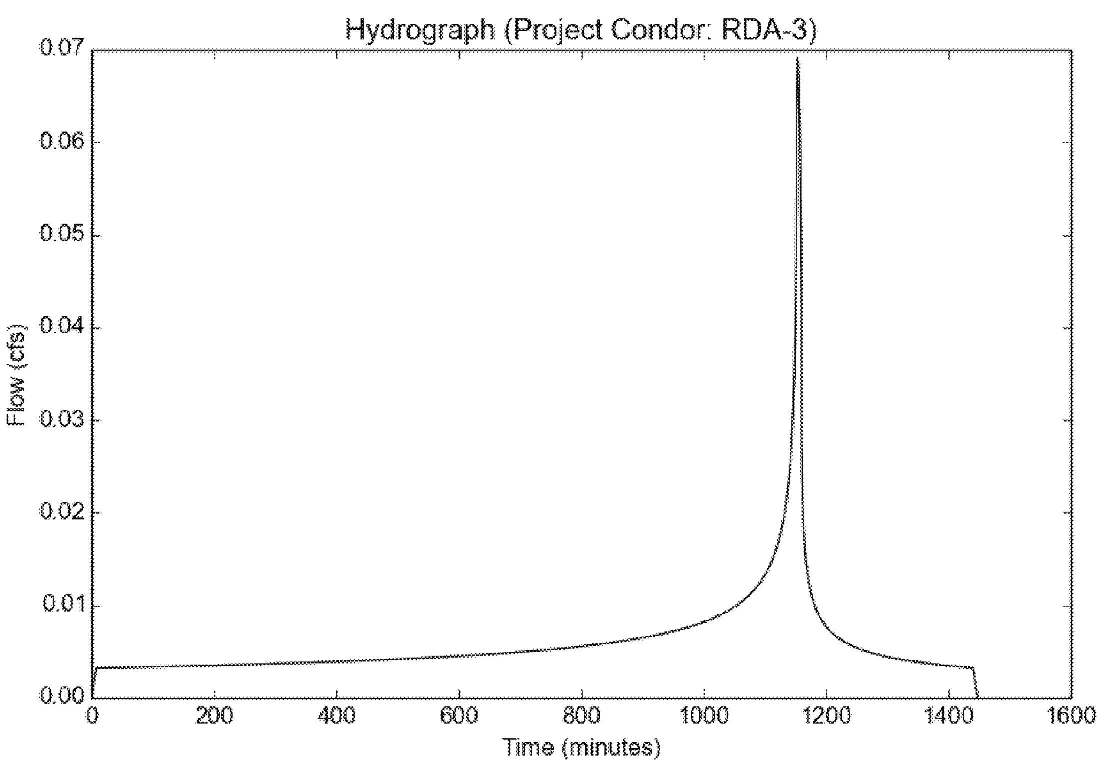
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	RDA-3
Area (ac)	0.16
Flow Path Length (ft)	120.0
Flow Path Slope (vft/hft)	0.02
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.95
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.5023
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	0.0691
Burned Peak Flow Rate (cfs)	0.0691
24-Hr Clear Runoff Volume (ac-ft)	0.0119
24-Hr Clear Runoff Volume (cu-ft)	520.1284



Peak Flow Hydrologic Analysis

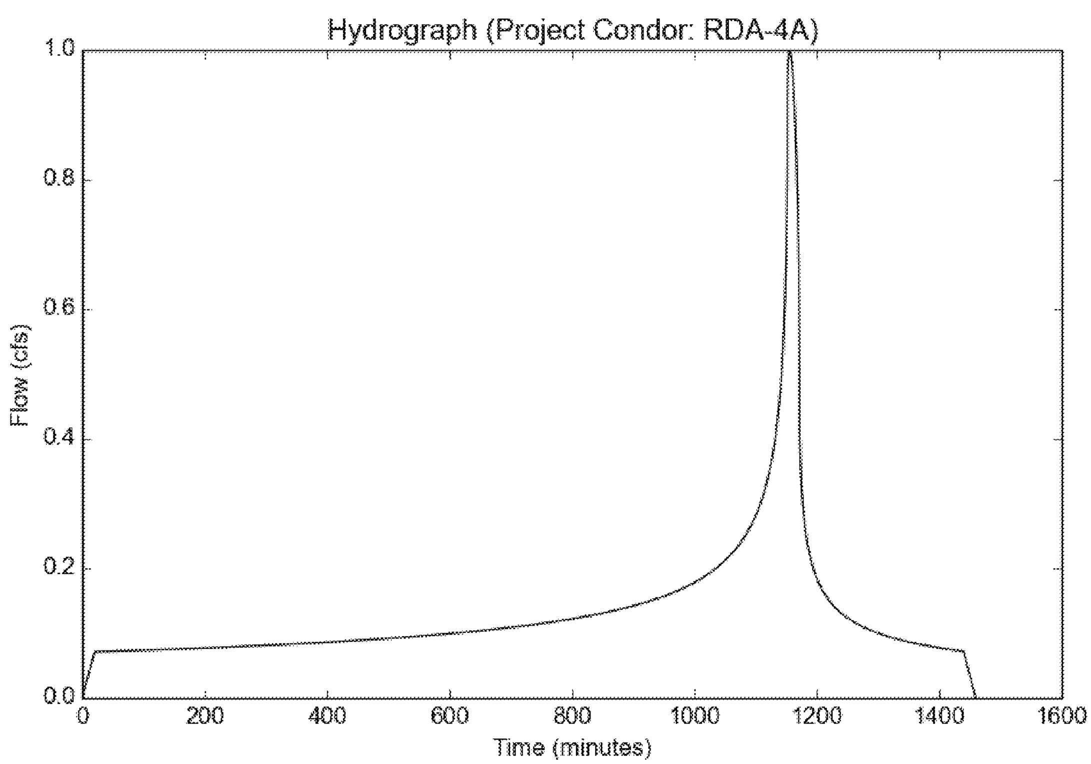
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	RDA-4A
Area (ac)	3.55
Flow Path Length (ft)	480.0
Flow Path Slope (vft/hft)	0.02
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.95
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.3265
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	20.0
Clear Peak Flow Rate (cfs)	0.9969
Burned Peak Flow Rate (cfs)	0.9969
24-Hr Clear Runoff Volume (ac-ft)	0.2649
24-Hr Clear Runoff Volume (cu-ft)	11540.3985



Peak Flow Hydrologic Analysis

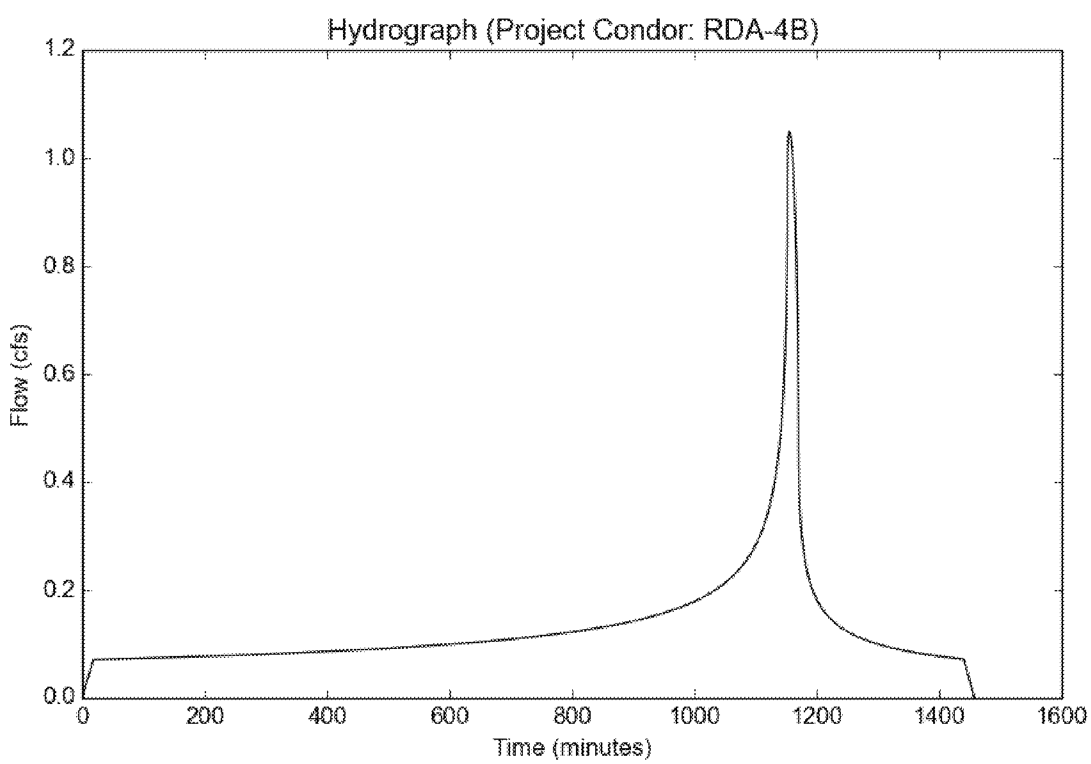
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	RDA-4B
Area (ac)	3.55
Flow Path Length (ft)	390.0
Flow Path Slope (vft/hft)	0.02
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.95
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.3431
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	18.0
Clear Peak Flow Rate (cfs)	1.0475
Burned Peak Flow Rate (cfs)	1.0475
24-Hr Clear Runoff Volume (ac-ft)	0.2649
24-Hr Clear Runoff Volume (cu-ft)	11540.3873



Peak Flow Hydrologic Analysis

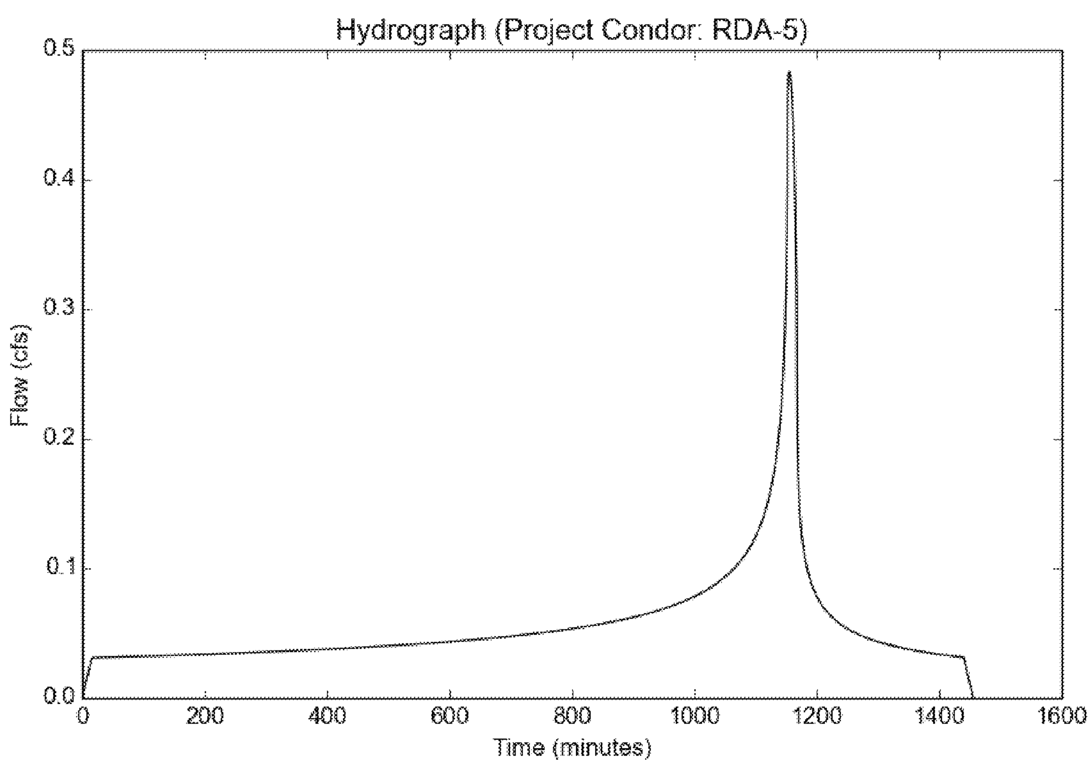
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	RDA-5
Area (ac)	1.55
Flow Path Length (ft)	330.0
Flow Path Slope (vft/hft)	0.02
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.95
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.3626
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	0.4834
Burned Peak Flow Rate (cfs)	0.4834
24-Hr Clear Runoff Volume (ac-ft)	0.1157
24-Hr Clear Runoff Volume (cu-ft)	5038.7563



Peak Flow Hydrologic Analysis

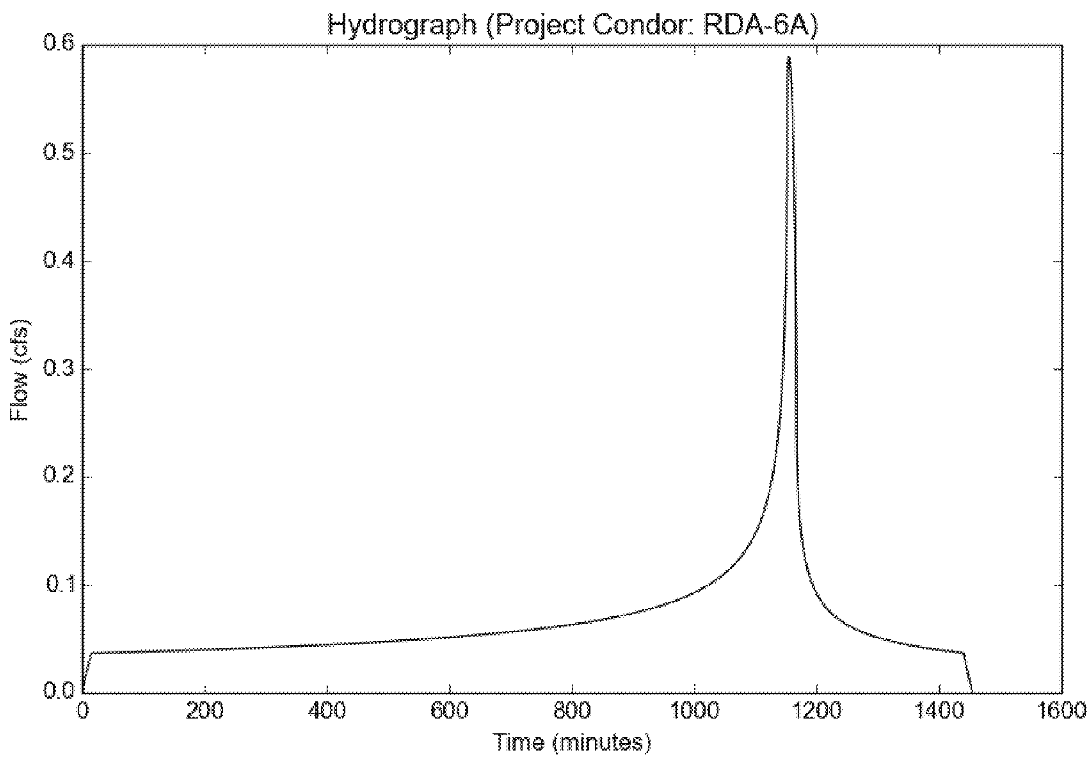
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	RDA-6A
Area (ac)	1.83
Flow Path Length (ft)	310.0
Flow Path Slope (vft/hft)	0.02
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.95
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.3738
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	15.0
Clear Peak Flow Rate (cfs)	0.5883
Burned Peak Flow Rate (cfs)	0.5883
24-Hr Clear Runoff Volume (ac-ft)	0.1366
24-Hr Clear Runoff Volume (cu-ft)	5948.9809



Peak Flow Hydrologic Analysis

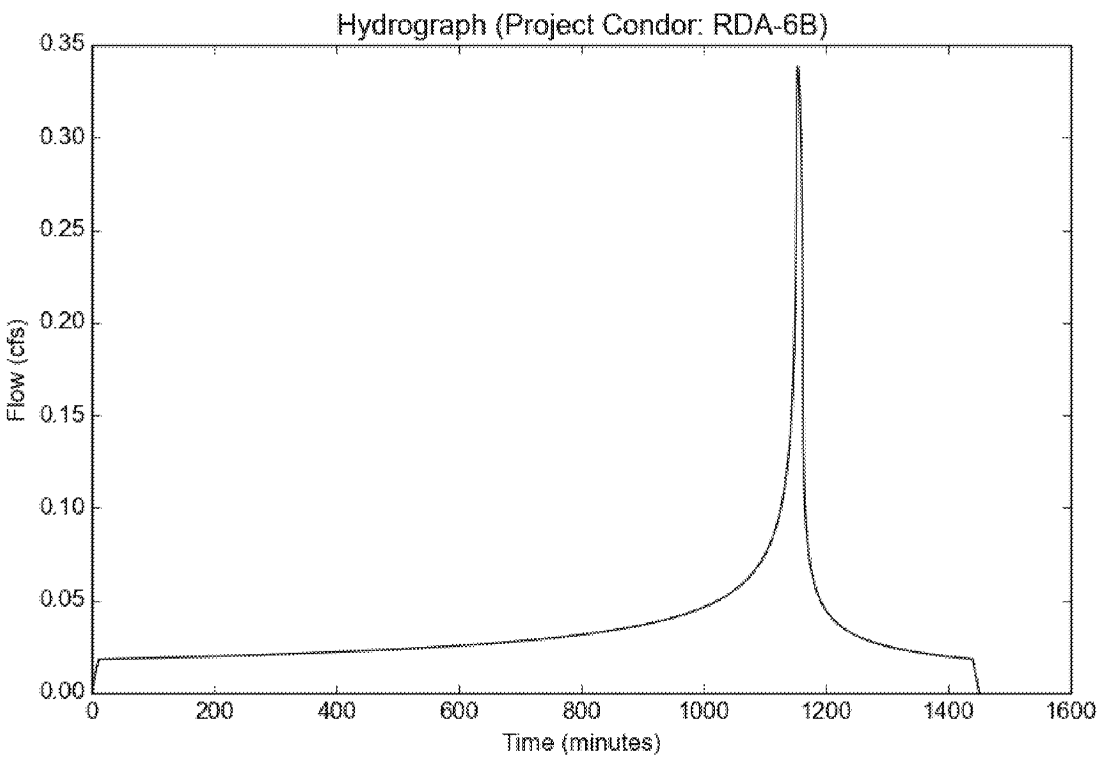
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	RDA-6B
Area (ac)	0.91
Flow Path Length (ft)	190.0
Flow Path Slope (vft/hft)	0.02
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.95
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.4325
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	0.3384
Burned Peak Flow Rate (cfs)	0.3384
24-Hr Clear Runoff Volume (ac-ft)	0.0679
24-Hr Clear Runoff Volume (cu-ft)	2958.2325



Peak Flow Hydrologic Analysis

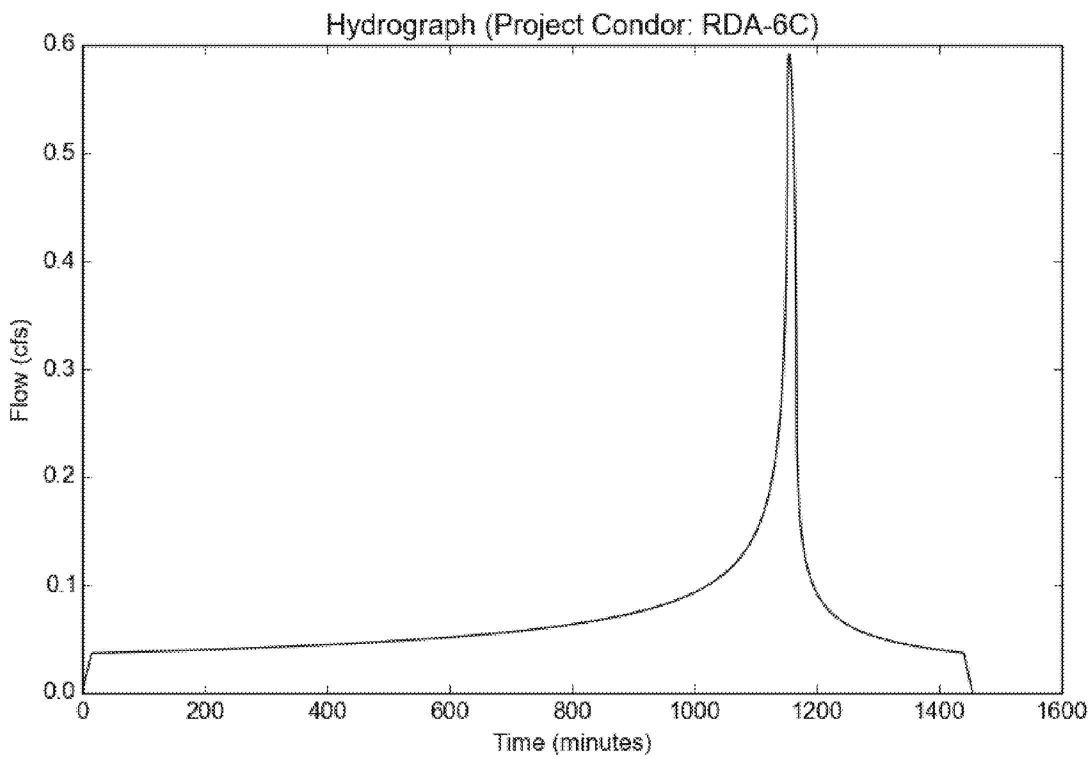
File location: M:/17001/Eng/17001/Hm/LID/Project Condor Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project Condor
Subarea ID	RDA-6C
Area (ac)	1.84
Flow Path Length (ft)	320.0
Flow Path Slope (vft/hft)	0.02
85th Percentile Rainfall Depth (in)	1.05
Percent Impervious	0.95
Soil Type	13
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.05
Peak Intensity (in/hr)	0.3738
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.86
Time of Concentration (min)	15.0
Clear Peak Flow Rate (cfs)	0.5915
Burned Peak Flow Rate (cfs)	0.5915
24-Hr Clear Runoff Volume (ac-ft)	0.1373
24-Hr Clear Runoff Volume (cu-ft)	5981.489



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Appendix C

Bio-Filtration Sizing Calculations

LID SUMMARY TABLE

	AREA						
SUBAREA	SF	ACRE	Vm	Vdesign	Qpm	Amin	BMP Provided
DA-1	90,537	2.08	6447	9671	0.5852	**3,868**	PLANTER B
DA-2	33,854	0.78	2418	3627	0.3040	**1,451**	PLANTER B
DA-3	43,992	1.01	3131	4697	0.3936	**1,879**	PLANTER B
DA-4	18,343	0.42	1302	1953	0.1558	68	FILTERRA
DA-5	39,116	0.90	2790	4185	0.3192	143	FILTERRA
DA-6	45,775	1.05	3255	4883	0.4325	179	FILTERRA
DA-7	41,333	0.95	2945	4418	0.2382	130	FILTERRA
DA-8	92,868	2.13	6602	9903	0.4714	275	FILTERRA
DA-9	25,185	0.58	1798	2697	0.1398	78	FILTERRA
DA-10	39,073	0.90	2790	4185	0.2951	138	FILTERRA
DA-11	12,631	0.29	899	1349	0.0889	43	FILTERRA
RDA-1	17,696	0.41	1333	2000	0.1676	**800**	PLANTER A
RDA-2	17,985	0.41	1333	2000	0.1595	**800**	PLANTER A
RDA-3	6,815	0.16	520	780	0.0691	**312**	PLANTER A
RDA-4A	154,674	3.55	11540	17310	0.9969	**6,924**	PLANTER A
RDA-4B	154,692	3.55	11540	17310	1.0475	**6,924**	PLANTER A
RDA-5	67,342	1.55	5039	7559	0.4834	**3,023**	PLANTER A
RDA-6A	79,803	1.83	5949	8924	0.5883	**3,569**	PLANTER A
RDA-6B	39,726	0.91	2958	4437	0.3384	**1,775**	PLANTER A
RDA-6C	80,006	1.84	5981	8972	0.5915	**3,589**	PLANTER A

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LID CALCULATIONS

DRAINAGE AREA	**PLANTER**
DA-1	P1

Site area:	90,537	sf
Impervious	0.90	%
85th Percentile:	1.05	in
Volume (V_m):	6447	cf
$V_{design} = V_m*1.5$	9671	cf

Note: For Flow Through Planters

V_{design} = 1.5*Vm

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	51	in
d_p	12	in
A_{min}=	3,868	sf

$$A_{min} = \frac{V_{design}}{\frac{T * K_{sat,des} + d_p}{12}}$$

T=	Drawdown Time
$H_{planter}$ =	Planter Height
d_p =	Ponding Depth
A_{min} =	Minimum Area Required

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LID CALCULATIONS

DRAINAGE AREA	**PLANTER**
DA-2	P2

Site area:	33,854	sf
Impervious	0.90	%
85th Percentile:	1.05	in
Volume (V_m):	2418	cf
$V_{design} = V_m*1.5$	3627	cf

Note: For Flow Through Planters

V_{design} = 1.5*Vm

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	51	in
d_p	12	in
A_{min}=	1,450.8	sf

$$\text{Amin} = \frac{V_{design}}{\frac{T * K_{sat,des} + d_p}{12}}$$

T=	Drawdown Time
$H_{planter}$ =	Planter Height
d_p =	Ponding Depth
A_{min} =	Minimum Area Required

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LID CALCULATIONS

DRAINAGE AREA	**PLANTER**
DA-3	P3

Site area:	43,992	sf
Impervious	0.90	%
85th Percentile:	1.05	in
Volume (V_m):	3131	cf
$V_{design} = V_m*1.5$	4697	cf

Note: For Flow Through Planters

V_{design} = 1.5*Vm

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	57	in
d_p	12	in
A_{min}=	1,878.6	sf

$$Amin = \frac{V_{design}}{\frac{T * K_{sat,des} + d_p}{12}}$$

T= Drawdown Time

$H_{planter}$ = Planter Height

d_p = Ponding Depth

A_{min} = Minimum Area Required

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LID CALCULATIONS

DRAINAGE AREA	**PLANTER**
RDA-1	P4

Site area:	17,696	sf
Impervious	0.95	%
85th Percentile:	1.05	in
Volume (V_m):	1333	cf
$V_{design} = V_m*1.5$	2000	cf

Note: For Flow Through Planters

$$V_{design} = 1.5*Vm$$

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	51	in
d_p	12	in
A_{min}=	799.8	sf

$$Amin = \frac{V_{design}}{\frac{T * K_{sat,des} + d_p}{12}}$$

T=	Drawdown Time
$H_{planter}$ =	Planter Height
d_p =	Ponding Depth
A_{min} =	Minimum Area Required

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LID CALCULATIONS

DRAINAGE AREA	**PLANTER**
RDA-2	P5

Site area:	17,985	sf
Impervious	0.95	%
85th Percentile:	1.05	in
Volume (V_m):	1333	cf
$V_{design} = V_m$*1.5	2000	cf

Note: For Flow Through Planters

V_{design} = 1.5*Vm

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	57	in
d_p	12	in
A_{min}=	799.8	sf

$$A_{min} = \frac{V_{design}}{\frac{T * K_{sat,des} + d_p}{12}}$$

T=	Drawdown Time
$H_{planter}$ =	Planter Height
d_p =	Ponding Depth
A_{min} =	Minimum Area Required

PROJECT CONDOR

INGLEWOOD, CA

LID CALCULATIONS

DRAINAGE AREA	**PLANTER**
RDA-3	P6

Site area:	6,815	sf
Impervious	0.95	%
85th Percentile:	1.05	in
Volume (V_m):	520	cf
$V_{design} = V_m$*1.5	780	cf

Note: For Flow Through Planters

V_{design} = 1.5*Vm

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	57	in
d_p	12	in
A_{min}=	312.0	sf

$$Amin = \frac{V_{design}}{\frac{T * K_{sat,des} + d_p}{12}}$$

T= Drawdown Time

$H_{planter}$ = Planter Height

d_p = Ponding Depth

A_{min} = Minimum Area Required

PROJECT CONDOR

INGLEWOOD, CA

LID CALCULATIONS

DRAINAGE AREA	**PLANTER**
RDA-4A	P7, P8

Site area:	154,674	sf
Impervious	0.95	%
85th Percentile:	1.05	in
Volume (V_m):	11540	cf
$V_{design} = V_m*1.5$	17310	cf

Note: For Flow Through Planters

V_{design} = 1.5*Vm

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	51	in
d_p	12	in
A_{min}=	6,924.0	sf

$$Amin = \frac{V_{design}}{\frac{T * K_{sat,des} + d_p}{12}}$$

T=	Drawdown Time
$H_{planter}$ =	Planter Height
d_p =	Ponding Depth
A_{min} =	Minimum Area Required

PROJECT CONDOR

INGLEWOOD, CA

LID CALCULATIONS

DRAINAGE AREA	PLANTER
RDA-4B	P11

Site area:	154,692	sf
Impervious	0.95	%
85th Percentile:	1.05	in
Volume (V_m):	11540	cf
$V_{design} = V_m*1.5$	17310	cf

Note: For Flow Through Planters

V_{design} = 1.5*Vm

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	51	in
d_p	12	in
A_{min}=	6,924.0	sf

$$Amin = \frac{V_{design}}{\frac{T * K_{sat,des} + d_p}{12}}$$

T=	Drawdown Time
$H_{planter}$ =	Planter Height
d_p =	Ponding Depth
A_{min} =	Minimum Area Required

PROJECT CONDOR

INGLEWOOD, CA

LID CALCULATIONS

DRAINAGE AREA	PLANTER
RDA-5	P9, 10

Site area:	67,342	sf
Impervious	0.95	%
85th Percentile:	1.05	in
Volume (V_m):	5039	cf
$V_{design} = V_m*1.5$	7559	cf

Note: For Flow Through Planters

V_{design} = 1.5*Vm

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	51	in
d_p	12	in
A_{min}=	3,023.4	sf

$$Amin = \frac{V_{design}}{\frac{T * K_{sat,des} + d_p}{12}}$$

T=	Drawdown Time
$H_{planter}$ =	Planter Height
d_p =	Ponding Depth
A_{min} =	Minimum Area Required

PROJECT CONDOR

INGLEWOOD, CA

LID CALCULATIONS

DRAINAGE AREA	PLANTER
RDA-6A	P12

Site area:	79,803	sf
Impervious	0.95	%
85th Percentile:	1.05	in
Volume (V_m):	5949	cf
$V_{design} = V_m*1.5$	8924	cf

Note: For Flow Through Planters

V_{design} = 1.5*Vm

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	51	in
d_p	12	in
A_{min}=	3,569.4	sf

$$\text{Amin} = \frac{V_{design}}{\frac{T * K_{sat,des} + d_p}{12}}$$

T=	Drawdown Time
$H_{planter}$ =	Planter Height
d_p =	Ponding Depth
A_{min} =	Minimum Area Required

PROJECT CONDOR

INGLEWOOD, CA

LID CALCULATIONS

DRAINAGE AREA	PLANTER
RDA-6B	P13

Site area:	39,726	sf
Impervious	0.95	%
85th Percentile:	1.05	in
Volume (V_m):	2958	cf
$V_{design} = V_m*1.5$	4437	cf

Note: For Flow Through Planters

V_{design} = 1.5*Vm

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	51	in
d_p	12	in
A_{min}=	1,774.8	sf

$$\text{Amin} = \frac{V_{design}}{\frac{T * K_{sat,des}}{12} + d_p}$$

T=	Drawdown Time
$H_{planter}$ =	Planter Height
d_p =	Ponding Depth
A_{min} =	Minimum Area Required

PROJECT CONDOR

INGLEWOOD, CA

LID CALCULATIONS

DRAINAGE AREA	PLANTER
RDA-6C	P14

Site area:	80,006	sf
Impervious	0.95	%
85th Percentile:	1.05	in
Volume (V_m):	5981	cf
$V_{design} = V_m*1.5$	8972	cf

Note: For Flow Through Planters

V_{design} = 1.5*Vm

Sizing		Units
K_{sat}	12	in/hour
FS	2	-
$K_{sat,des} = (K_{sat}/FS)$	6	in/hour
T	3	hrs
$H_{planter}$	51	in
d_p	12	in
A_{min}=	3,588.6	sf

$$Amin = \frac{V_{design}}{\frac{T * K_{sat,des} + d_p}{12}}$$

T=	Drawdown Time
$H_{planter}$ =	Planter Height
d_p =	Ponding Depth
A_{min} =	Minimum Area Required

CONTECH® ENGINEERED SOLUTIONS

filterra Bioretention Systems

Filterra Sizing Tool

Applicable in the Area Governed by the Los Angeles County MS4 Permit

(NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175)

For final design please contact:
Alexandra Dubrock - Stormwater Consultant
adubrock@conteches.com
Phone: 949-217-4663

Contact Information		Project Information	
Engineer of Record Name	Robert Dizon	Project Name	Condor
Engineer of Record Company Name	D&D Engineering, Inc.	Project Location	Inglewood, CA
Engineer of Record Office Zip Code	90301	Catchment Name	DA-4

Drainage Area Inputs

Drainage Area	**18343**	ft^2
Runoff coefficient	**0.9**	-
Time of concentration	**10**	min
Long term reliable infiltration rate	**0.09**	in/hr
85th percentile, 24-hour depth (see hyperlink below)	**1.05**	in

LA County Rainfall Depth Analysis

Filterra Configuration (Select from Drop-Down) — **Internal Bypass Pipe**

Refer to "Filterra Configurations" tab for descriptions and standard details for download.

Constants

LAX Airport 85th Percentile, 24-hour depth (for reference only)	1.02	in
Filterra hydraulic loading capacity	1.45	gpm/ft^2

Outputs

Stormwater Quality Design Volume	1,445	ft^3
Design Rainfall Intensity for Equivalent Long Term Capture	0.382	in/hr
Site Scaling Factor	1.03	-
Stormwater Quality Design Flow Rate	0.15	cfs
Design Alternatives Available	**Stand Alone Filterra Permitted**	

Design Recommendations

Primary Recommendation - Stand Alone Filterra

Adjusted Filterra Design Intensity	0.560	in/hr
Stormwater Quality Design Flow Rate	0.22	cfs
Required Filterra Area	68	ft^2
Filterra Model ID	**FTIBP 6x12 / 12x6**	

Alternative Recommendation - Filterra + Infiltration Storage

Required Filterra Area	47	ft^2
Filterra Model ID	**FTIBP 6x8 / 8x6**	
ChamberMaxx volume	194	ft^3
ChamberMaxx count	**3**	chambers

To be constent with approval of the Filterra Bioretention System as an alternative biofiltration specification granted by the Los Angeles Regional Water Quality Control Board on October 9, 2017, Filterra use is subject to the following conditions:

1. Filterra systems must be designed and sized following the methodology in Section 4 of the August 2015 report prepared by Geosyntec Consultants, entitled "Filterra Equivalency Analysis and Design Criteria" which is the basis for this design tool.
2. Filterra systems use an engineered biofiltration media. Filterra systems, including the engineered biofiltration media, must be provided by the manufacturer. No substitution of materials/media is allowed.
3. Filterra is only applicable as an alternative on-site biofiltration design in situations where a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site.
4. Hydromodification requirements of Section VI.D.7.c.iv of the Los Angeles County MS4 Permit must be considered separately regardless of what type of biofiltration is used.
5. Operation and maintenance of Filterra systems must be conducted consistent with the recommendations in the Filterra maintenance manual provided by Contech Engineered Solutions.
6. In the area governed by the Los Angeles Region Phase I stormwater permit, conventional biofilters must be sized to treat 1.5X the SWQDV. This results in an average annual capture rate of 93%. Filterra systems sized using this tool will also treat at least 93% of the average annual runoff volume.

CONTECH ENGINEERED SOLUTIONS

filterra Bioretention Systems

Filterra Sizing Tool

Applicable in the Area Governered by the Los Angeles County MS4 Permit

(NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175)

For final design please contact:
Alexandra Dubrock - Stormwater Consultant
adubrock@conteches.com
Phone: 949-217-4663

Contact Information		**Project Information**	
Engineer of Record Name	Robert Dizon	Project Name	Condor
Engineer of Record Company Name	D&D Engineering, Inc.	Project Location	Inglewood, CA
Engineer of Record Office Zip Code	90301	Catchment Name	DA-5

Drainage Area Inputs

Drainage Area	**39116**	ft^2
Runoff coefficient	**0.9**	-
Time of concentration	**11**	min
Long term reliable infiltration rate	**0.09**	in/hr
85th percentile, 24-hour depth (see hyperlink below)	**1.05**	in

LA County Rainfall Depth Analysis

Filterra Configuration (Select from Drop-Down)	**Internal Bypass Pipe**	

Refer to "Filterra Configurations" tab for descriptions and standard details for download.

Constants

LAX Airport 85th Percentile, 24-hour depth (for reference only)	1.02	in
Filterra hydraulic loading capacity	1.45	gpm/ft^2

Outputs

Stormwater Quality Design Volume	3,080	ft^3
Design Rainfall Intensity for Equivalent Long Term Capture	0.377	in/hr
Site Scaling Factor	1.03	-
Stormwater Quality Design Flow Rate	0.32	cfs
Design Alternatives Available	**Stand Alone Filterra Permitted**	

Design Recommendations

Primary Recommendation - Stand Alone Filterra

Adjusted Filterra Design Intensity	0.551	in/hr
Stormwater Quality Design Flow Rate	0.46	cfs
Required Filterra Area	143	ft^2
Filterra Model ID	**See Note**	

Note: Drainage area is too large for single Filterra system. Consider a different Filterra configuration, utilizing multiple structures, or utilizing Filterra Bioscape. Contact Contech for more info.

Alternative Recommendation - Filterra + Infiltration Storage

Required Filterra Area	98	ft^2
Filterra Model ID	**See Note**	
ChamberMaxx volume	413	ft^3
ChamberMaxx count	**6**	chambers

Note: Drainage area is too large for single Filterra system. Consider a different Filterra configuration, utilizing multiple structures, or utilizing Filterra Bioscape. Contact Contech for more info.

To be constent with approval of the Filterra Bioretention System as an alternative biofiltration specification granted by the Los Angeles Regional Water Quality Control Board on October 9, 2017, Filterra use is subject to the following conditions:

1. Filterra systems must be designed and sized following the methodology in Section 4 of the August 2015 report prepared by Geosyntec Consultants, entitled "Filterra Equivalency Analysis and Design Criteria" which is the basis for this design tool.
2. Filterra systems use an engineered biofiltration media. Filterra systems, including the engineered biofiltration media, must be provided by the manufacturer. No substitution of materials/media is allowed.
3. Filterra is only applicable as an alternative on-site biofiltration design in situations where a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site.
4. Hydromodification requirements of Section VI.D.7.c.iv of the Los Angeles County MS4 Permit must be considered separately regardless of what type of biofiltration is used.
5. Operation and maintenance of Filterra systems must be conducted consistent with the recommendations in the Filterra maintenance manual provided by Contech Engineered Solutions.
6. In the area governed by the Los Angeles Region Phase I stormwater permit, conventional biofilters must be sized to treat 1.5X the SWQDV. This results in an average annual capture rate of 93%. Filterra systems sized using this tool will also treat at least 93% of the average annual runoff volume.

CONTECH
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filterra
Bioretention Systems

Filterra Sizing Tool

Applicable in the Area Governed by the Los Angeles County MS4 Permit
(NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175)

For final design please contact:
Alexandra Dubrock - Stormwater Consultant
adubrock@conteches.com
Phone: 949-217-4663

Contact Information		**Project Information**	
Engineer of Record Name	Robert Dizon	Project Name	Condor
Engineer of Record Company Name	D&D Engineering, Inc.	Project Location	Inglewood, CA
Engineer of Record Office Zip Code	90301	Catchment Name	DA-6

Drainage Area Inputs

Drainage Area	**45775**	ft^2
Runoff coefficient	**0.9**	-
Time of concentration	**8**	min
Long term reliable infiltration rate	**0.09**	in/hr
85th percentile, 24-hour depth (see hyperlink below)	**1.05**	in

LA County Rainfall Depth Analysis

Filterra Configuration (Select from Drop-Down)	**Internal Bypass Pipe**

Refer to "Filterra Configurations" tab for descriptions and standard details for download.

Constants

LAX Airport 85th Percentile, 24-hour depth (for reference only)	1.02	in
Filterra hydraulic loading capacity	1.45	gpm/ft^2

Outputs

Stormwater Quality Design Volume	3,605	ft^3
Design Rainfall Intensity for Equivalent Long Term Capture	0.392	in/hr
Site Scaling Factor	1.03	-
Stormwater Quality Design Flow Rate	0.39	cfs
Design Alternatives Available	**Stand Alone Filterra Permitted**	

Design Recommendations

Primary Recommendation - Stand Alone Filterra

Adjusted Filterra Design Intensity	0.589	in/hr
Stormwater Quality Design Flow Rate	0.58	cfs
Required Filterra Area	179	ft^2
Filterra Model ID	**See Note**	

Note: Drainage area is too large for single Filterra system. Consider a different Filterra configuration, utilizing multiple structures, or utilizing Filterra Bioscape. Contact Contech for more info.

Alternative Recommendation - Filterra + Infiltration Storage

Required Filterra Area	120	ft^2
Filterra Model ID	**See Note**	
ChamberMaxx volume	483	ft^3
ChamberMaxx count	**7**	chambers

Note: Drainage area is too large for single Filterra system. Consider a different Filterra configuration, utilizing multiple structures, or utilizing Filterra Bioscape. Contact Contech for more info.

To be constent with approval of the Filterra Bioretention System as an alternative biofiltration specification granted by the Los Angeles Regional Water Quality Control Board on October 9, 2017, Filterra use is subject to the following conditions:

1. Filterra systems must be designed and sized following the methodology in Section 4 of the August 2015 report prepared by Geosyntec Consultants, entitled "Filterra Equivalency Analysis and Design Criteria" which is the basis for this design tool.
2. Filterra systems use an engineered biofiltration media. Filterra systems, including the engineered biofiltration media, must be provided by the manufacturer. No substitution of materials/media is allowed.
3. Filterra is only applicable as an alternative on-site biofiltration design in situations where a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site.
4. Hydromodification requirements of Section VI.D.7.c.iv of the Los Angeles County MS4 Permit must be considered separately regardless of what type of biofiltration is used.
5. Operation and maintenance of Filterra systems must be conducted consistent with the recommendations in the Filterra maintenance manual provided by Contech Engineered Solutions.
6. In the area governed by the Los Angeles Region Phase I stormwater permit, conventional biofilters must be sized to treat 1.5X the SWQDV. This results in an average annual capture rate of 93%. Filterra systems sized using this tool will also treat at least 93% of the average annual runoff volume.

CONTECH ENGINEERED SOLUTIONS

filterra Bioretention Systems

Filterra Sizing Tool

Applicable in the Area Goverened by the Los Angeles County MS4 Permit

(NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175)

For final design please contact:
Alexandra Dubrock - Stormwater Consultant
adubrock@conteches.com
Phone: 949-217-4663

Contact Information		**Project Information**	
Engineer of Record Name	Robert Dizon	Project Name	Condor
Engineer of Record Company Name	D&D Engineering, Inc.	Project Location	Inglewood, CA
Engineer of Record Office Zip Code	90301	Catchment Name	DA-7

Drainage Area Inputs		
Drainage Area	**41333**	ft^2
Runoff coefficient	**0.9**	-
Time of concentration	**23**	min
Long term reliable infiltration rate	**0.09**	in/hr
85th percentile, 24-hour depth (see hyperlink below)	**1.05**	in
LA County Rainfall Depth Analysis		
Filterra Configuration (Select from Drop-Down)	**Internal Bypass Curb**	
Refer to "Filterra Configurations" tab for descriptions and standard details for download.		
Constants		
LAX Airport 85th Percentile, 24-hour depth (for reference only)	1.02	in
Filterra hydraulic loading capacity	1.45	gpm/ft^2
Outputs		
Stormwater Quality Design Volume	3,255	ft^3
Design Rainfall Intensity for Equivalent Long Term Capture	0.332	in/hr
Site Scaling Factor	1.03	-
Stormwater Quality Design Flow Rate	0.29	cfs
Design Alternatives Available	**Stand Alone Filterra Permitted**	

Design Recommendations

Primary Recommendation - Stand Alone Filterra

Adjusted Filterra Design Intensity	0.474	in/hr
Stormwater Quality Design Flow Rate	0.42	cfs
Required Filterra Area	130	ft^2
Filterra Model ID	**See Note**	

Note: Drainage area is too large for single Filterra system. Consider a different Filterra configuration, utilizing multiple structures, or utilizing Filterra Bioscape. Contact Contech for more info.

Alternative Recommendation - Filterra + Infiltration Storage

Required Filterra Area	92	ft^2
Filterra Model ID	**See Note**	
ChamberMaxx volume	436	ft^3
ChamberMaxx count	**6**	chambers

Note: Drainage area is too large for single Filterra system. Consider a different Filterra configuration, utilizing multiple structures, or utilizing Filterra Bioscape. Contact Contech for more info.

To be constent with approval of the Filterra Bioretention System as an alternative biofiltration specification granted by the Los Angeles Regional Water Quality Control Board on October 9, 2017, Filterra use is subject to the following conditions:

1. Filterra systems must be designed and sized following the methodology in Section 4 of the August 2015 report prepared by Geosyntec Consultants, entitled "Filterra Equivalency Analysis and Design Criteria" which is the basis for this design tool.
2. Filterra systems use an engineered biofiltration media. Filterra systems, including the engineered biofiltration media, must be provided by the manufacturer. No substitution of materials/media is allowed.
3. Filterra is only applicable as an alternative on-site biofiltration design in situations where a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site.
4. Hydromodification requirements of Section VI.D.7.c.iv of the Los Angeles County MS4 Permit must be considered separately regardless of what type of biofiltration is used.
5. Operation and maintenance of Filterra systems must be conducted consistent with the recommendations in the Filterra maintenance manual provided by Contech Engineered Solutions.
6. In the area governed by the Los Angeles Region Phase I stormwater permit, conventional biofilters must be sized to treat 1.5X the SWQDV. This results in an average annual capture rate of 93%. Filterra systems sized using this tool will also treat at least 93% of the average annual runoff volume.

Filterra Sizing Tool

Applicable in the Area Goverened by the Los Angeles County MS4 Permit

(NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175)

For final design please contact:
Alexandra Dubrock - Stormwater Consultant
adubrock@conteches.com
Phone: 949-217-4663

Contact Information		**Project Information**	
Engineer of Record Name	Robert Dizon	Project Name	Condor
Engineer of Record Company Name	D&D Engineering, Inc.	Project Location	Inglewood, CA
Engineer of Record Office Zip Code	90301	Catchment Name	DA-8

Drainage Area Inputs

Drainage Area	**92868**	ft^2
Runoff coefficient	**0.9**	-
Time of concentration	**30**	min
Long term reliable infiltration rate	**0.09**	in/hr
85th percentile, 24-hour depth (see hyperlink below)	**1.05**	in

LA County Rainfall Depth Analysis

Filterra Configuration (Select from Drop-Down) — **Internal Bypass Curb**

Refer to "Filterra Configurations" tab for descriptions and standard details for download.

Constants

LAX Airport 85th Percentile, 24-hour depth (for reference only)	1.02	in
Filterra hydraulic loading capacity	1.45	gpm/ft^2

Outputs

Stormwater Quality Design Volume	7,313	ft^3
Design Rainfall Intensity for Equivalent Long Term Capture	0.320	in/hr
Site Scaling Factor	1.03	-
Stormwater Quality Design Flow Rate	0.64	cfs
Design Alternatives Available	**Stand Alone Filterra Permitted**	

Design Recommendations

Primary Recommendation - Stand Alone Filterra

Adjusted Filterra Design Intensity	0.446	in/hr
Stormwater Quality Design Flow Rate	0.89	cfs
Required Filterra Area	275	ft^2
Filterra Model ID	**See Note**	

Note: Drainage area is too large for single Filterra system. Consider a different Filterra configuration, utilizing multiple structures, or utilizing Filterra Bioscape. Contact Contech for more info.

Alternative Recommendation - Filterra + Infiltration Storage

Required Filterra Area	198	ft^2
Filterra Model ID	**See Note**	
ChamberMaxx volume	980	ft^3
ChamberMaxx count	**13**	chambers

Note: Drainage area is too large for single Filterra system. Consider a different Filterra configuration, utilizing multiple structures, or utilizing Filterra Bioscape. Contact Contech for more info.

To be constent with approval of the Filterra Bioretention System as an alternative biofiltration specification granted by the Los Angeles Regional Water Quality Control Board on October 9, 2017, Filterra use is subject to the following conditions:

1. Filterra systems must be designed and sized following the methodology in Section 4 of the August 2015 report prepared by Geosyntec Consultants, entitled "Filterra Equivalency Analysis and Design Criteria" which is the basis for this design tool.
2. Filterra systems use an engineered biofiltration media. Filterra systems, including the engineered biofiltration media, must be provided by the manufacturer. No substitution of materials/media is allowed.
3. Filterra is only applicable as an alternative on-site biofiltration design in situations where a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site.
4. Hydromodification requirements of Section VI.D.7.c.iv of the Los Angeles County MS4 Permit must be considered separately regardless of what type of biofiltration is used.
5. Operation and maintenance of Filterra systems must be conducted consistent with the recommendations in the Filterra maintenance manual provided by Contech Engineered Solutions.
6. In the area governed by the Los Angeles Region Phase I stormwater permit, conventional biofilters must be sized to treat 1.5X the SWQDV. This results in an average annual capture rate of 93%. Filterra systems sized using this tool will also treat at least 93% of the average annual runoff volume.

CONTECH ENGINEERED SOLUTIONS

filterra Bioretention Systems

Filterra Sizing Tool

Applicable in the Area Goverened by the Los Angeles County MS4 Permit
(NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175)

For final design please contact:
Alexandra Dubrock - Stormwater Consultant
adubrock@conteches.com
Phone: 949-217-4663

Contact Information		Project Information	
Engineer of Record Name	Robert Dizon	Project Name	Condor
Engineer of Record Company Name	D&D Engineering, Inc.	Project Location	Inglewood, CA
Engineer of Record Office Zip Code	90301	Catchment Name	DA-9

Drainage Area Inputs

Drainage Area	**25185**	ft^2
Runoff coefficient	**0.9**	-
Time of concentration	**25**	min
Long term reliable infiltration rate	**0.09**	in/hr
85th percentile, 24-hour depth (see hyperlink below)	**1.05**	in

LA County Rainfall Depth Analysis

Filterra Configuration (Select from Drop-Down) — **Internal Bypass Curb**

Refer to "Filterra Configurations" tab for descriptions and standard details for download.

Constants

LAX Airport 85th Percentile, 24-hour depth (for reference only)	1.02	in
Filterra hydraulic loading capacity	1.45	gpm/ft^2

Outputs

Stormwater Quality Design Volume	1,983	ft^3
Design Rainfall Intensity for Equivalent Long Term Capture	0.328	in/hr
Site Scaling Factor	1.03	-
Stormwater Quality Design Flow Rate	0.18	cfs
Design Alternatives Available	**Stand Alone Filterra Permitted**	

Design Recommendations

Primary Recommendation - Stand Alone Filterra

Adjusted Filterra Design Intensity	0.466	in/hr
Stormwater Quality Design Flow Rate	0.25	cfs
Required Filterra Area	78	ft^2
Filterra Model ID	**FTIBC 7x13 / 13x7**	

Alternative Recommendation - Filterra + Infiltration Storage

Required Filterra Area	55	ft^2
Filterra Model ID	**FTIBC 6x10 / 10x6**	
ChamberMaxx volume	266	ft^3
ChamberMaxx count	**4**	chambers

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3. Filterra is only applicable as an alternative on-site biofiltration design in situations where a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site.
4. Hydromodification requirements of Section VI.D.7.c.iv of the Los Angeles County MS4 Permit must be considered separately regardless of what type of biofiltration is used.
5. Operation and maintenance of Filterra systems must be conducted consistent with the recommendations in the Filterra maintenance manual provided by Contech Engineered Solutions.
6. In the area governed by the Los Angeles Region Phase I stormwater permit, conventional biofilters must be sized to treat 1.5X the SWQDV. This results in an average annual capture rate of 93%. Filterra systems sized using this tool will also treat at least 93% of the average annual runoff volume.

CONTECH ENGINEERED SOLUTIONS

filterra Bioretention Systems

Filterra Sizing Tool

Applicable in the Area Governed by the Los Angeles County MS4 Permit

(NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175)

For final design please contact:
Alexandra Dubrock - Stormwater Consultant
adubrock@conteches.com
Phone: 949-217-4663

Contact Information		Project Information	
Engineer of Record Name	Robert Dizon	Project Name	Condor
Engineer of Record Company Name	D&D Engineering, Inc.	Project Location	Inglewood, CA
Engineer of Record Office Zip Code	90301	Catchment Name	DA-10

Drainage Area Inputs

Drainage Area	**39073**	ft^2
Runoff coefficient	**0.9**	-
Time of concentration	**13**	min
Long term reliable infiltration rate	**0.09**	in/hr
85th percentile, 24-hour depth (see hyperlink below)	**1.05**	in

LA County Rainfall Depth Analysis

Filterra Configuration (Select from Drop-Down): **Internal Bypass Curb**

Refer to "Filterra Configurations" tab for descriptions and standard details for download.

Constants

LAX Airport 85th Percentile, 24-hour depth (for reference only)	1.02	in
Filterra hydraulic loading capacity	1.45	gpm/ft^2

Outputs

Stormwater Quality Design Volume	3,077	ft^3
Design Rainfall Intensity for Equivalent Long Term Capture	0.367	in/hr
Site Scaling Factor	1.03	-
Stormwater Quality Design Flow Rate	0.31	cfs
Design Alternatives Available	**Stand Alone Filterra Permitted**	

Design Recommendations

Primary Recommendation - Stand Alone Filterra

Adjusted Filterra Design Intensity	0.532	in/hr
Stormwater Quality Design Flow Rate	0.45	cfs
Required Filterra Area	138	ft^2
Filterra Model ID	**See Note**	

Note: Drainage area is too large for single Filterra system. Consider a different Filterra configuration, utilizing multiple structures, or utilizing Filterra Bioscape. Contact Contech for more info.

Alternative Recommendation - Filterra + Infiltration Storage

Required Filterra Area	96	ft^2
Filterra Model ID	**See Note**	
ChamberMaxx volume	412	ft^3
ChamberMaxx count	**6**	chambers

Note: Drainage area is too large for single Filterra system. Consider a different Filterra configuration, utilizing multiple structures, or utilizing Filterra Bioscape. Contact Contech for more info.

To be constent with approval of the Filterra Bioretention System as an alternative biofiltration specification granted by the Los Angeles Regional Water Quality Control Board on October 9, 2017, Filterra use is subject to the following conditions:

1. Filterra systems must be designed and sized following the methodology in Section 4 of the August 2015 report prepared by Geosyntec Consultants, entitled "Filterra Equivalency Analysis and Design Criteria" which is the basis for this design tool.
2. Filterra systems use an engineered biofiltration media. Filterra systems, including the engineered biofiltration media, must be provided by the manufacturer. No substitution of materials/media is allowed.
3. Filterra is only applicable as an alternative on-site biofiltration design in situations where a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site.
4. Hydromodification requirements of Section VI.D.7.c.iv of the Los Angeles County MS4 Permit must be considered separately regardless of what type of biofiltration is used.
5. Operation and maintenance of Filterra systems must be conducted consistent with the recommendations in the Filterra maintenance manual provided by Contech Engineered Solutions.
6. In the area governed by the Los Angeles Region Phase I stormwater permit, conventional biofilters must be sized to treat 1.5X the SWQDV. This results in an average annual capture rate of 93%. Filterra systems sized using this tool will also treat at least 93% of the average annual runoff volume.

CONTECH ENGINEERED SOLUTIONS

filterra Bioretention Systems

Filterra Sizing Tool

Applicable in the Area Governed by the Los Angeles County MS4 Permit

(NPDES PERMIT NO. CAS004001; ORDER NO. R4-2012-0175)

For final design please contact:
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Phone: 949-217-4663

Contact Information		**Project Information**	
Engineer of Record Name	Robert Dizon	Project Name	Condor
Engineer of Record Company Name	D&D Engineering, Inc.	Project Location	Inglewood, CA
Engineer of Record Office Zip Code	90301	Catchment Name	DA-11

Drainage Area Inputs		
Drainage Area	**12631**	ft^2
Runoff coefficient	**0.9**	-
Time of concentration	**15**	min
Long term reliable infiltration rate	**0.09**	in/hr
85th percentile, 24-hour depth (see hyperlink below)	**1.05**	in
LA County Rainfall Depth Analysis		
Filterra Configuration (Select from Drop-Down)	**Internal Bypass Curb**	
Refer to "Filterra Configurations" tab for descriptions and standard details for download.		
Constants		
LAX Airport 85th Percentile, 24-hour depth (for reference only)	1.02	in
Filterra hydraulic loading capacity	1.45	gpm/ft^2
Outputs		
Stormwater Quality Design Volume	995	ft^3
Design Rainfall Intensity for Equivalent Long Term Capture	0.359	in/hr
Site Scaling Factor	1.03	-
Stormwater Quality Design Flow Rate	0.10	cfs
Design Alternatives Available	**Stand Alone Filterra Permitted**	
Design Recommendations		
Primary Recommendation - Stand Alone Filterra		
Adjusted Filterra Design Intensity	0.514	in/hr
Stormwater Quality Design Flow Rate	0.14	cfs
Required Filterra Area	43	ft^2
Filterra Model ID	**FTIBC 6x8 / 8x6**	
Alternative Recommendation - Filterra + Infiltration Storage		
Required Filterra Area	31	ft^2
Filterra Model ID	**FTIBC 4x8 / 8x4**	
ChamberMaxx volume	133	ft^3
ChamberMaxx count	**2**	chambers

To be constent with approval of the Filterra Bioretention System as an alternative biofiltration specification granted by the Los Angeles Regional Water Quality Control Board on October 9, 2017, Filterra use is subject to the following conditions:

1. Filterra systems must be designed and sized following the methodology in Section 4 of the August 2015 report prepared by Geosyntec Consultants, entitled "Filterra Equivalency Analysis and Design Criteria" which is the basis for this design tool.
2. Filterra systems use an engineered biofiltration media. Filterra systems, including the engineered biofiltration media, must be provided by the manufacturer. No substitution of materials/media is allowed.
3. Filterra is only applicable as an alternative on-site biofiltration design in situations where a project applicant has demonstrated that it is technically infeasible to retain 100 percent of the SWQDv on-site.
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