

LC ENGINEERING GROUP, INC.  
CONSULTING ENGINEERS

## CONCEPTUAL HYDROLOGY AND LID STUDY

04/04/2019 PROJECT NO. 7171

**LOCATION:**

**9712 Oak Pass Road  
Los Angeles, California**

**CLIENT: 9712 Oak Pass Road, LLC**

## Table of Contents

|                                      |   |
|--------------------------------------|---|
| 1. Introduction.....                 | 1 |
| 2. Description of Project Area ..... | 1 |
| 3. Hydrologic Analysis .....         | 1 |
| a. Watershed Area:.....              | 1 |
| b. Hydrologic Parameters: .....      | 2 |
| c. Hydrologic Calculations: .....    | 2 |
| 4. Detention Analysis.....           | 3 |
| 5. LID Calculations .....            | 4 |
| 6. Discussion .....                  | 5 |
| 7. Limitations .....                 | 5 |

## **List of Appendices**

Appendix A – Figures

Appendix B – Hydrology Calculations

Appendix C – LID Calculations

Appendix D –Hydrology and LID Exhibits

## **List of Figures**

Figure 1 - Los Angeles County Department of Public Works - Hydrology Manual

Hydrology Map –Fig. 1-H1.17 (Beverly Hills)

Figure 2 - Los Angeles County Department of Public Works - Hydrology Manual –

Runoff Coefficient Curve for Soil Type No.042

Figure 3- Los Angeles County Department of Public Works - Hydrology Manual –

Proportion Impervious Data

## 1. Introduction

9712 Oak Pass Road LLC proposes the subdivision of a 33-acre parcel located at 9712 Oak Pass Road, in the City of Los Angeles, California. Vesting Tentative Tract Map No. 74908 and related approvals propose the subdivision of the property into nine (9) parcels. Eight (8) of these parcels will be single family residential lots ranging in size from 1.50-acres to 5.62-acres for the subsequent development of custom single-family residences. One larger lot covering an area of 16.0-acres is proposed for the development of a hotel consisting of several structures. Development of the single-family residences and hotel will occur after completion of the subdivision and associated Tract infrastructure improvements.

The proposed subdivision includes development and associated grading activities for the creation of building pads on each lot for construction of future residences and hotel structures, and for construction of a Private Street varying in width from 24-feet to 40-feet. The street will provide vehicular access from both Oak Pass Road and Hutton Drive to the future residences and hotel. Additional improvements include the installation of utilities including the water and sewer improvements to serve all proposed structures, and drainage structures and facilities to treat and convey stormwater.

All new development and redevelopments are required to incorporate stormwater mitigation measure into the design to meet the requirements defined by the National Pollution Discharge Elimination System Permit (NPDES No. CAS004001) and the City of Los Angeles Municipal Code. This report discusses the conceptual LID design to meet the NPDES and City of Los Angeles requirements pertaining to stormwater treatment and mitigation.

## 2. Description of Project Area

The subject site is located in the community of Bel Air. Primary regional access to the site will be provided by the San Diego Freeway (Interstate 405), which is located approximately 2.7 miles west of the site. Access to the site from the 405 is provided by Mulholland Drive, Benedict Canyon Road and Hutton Drive. The majority of the site is undeveloped with the exception of a few structures and concrete surfaces.

## 3. Hydrologic Analysis

### a. Watershed Area:

**Existing Condition.** The subject site covers approximately 33-acres of mostly undeveloped land. In its existing condition, runoff from the site, along with portion of existing offsite area located south of the site, surface flows in a northerly direction. Onsite and offsite runoff flowing through the site is directed towards existing 66-in and 69-in RCP storm drain lines

located along Hutton Drive and Benedict Canyon Drive, respectively. These storm drain lines were constructed per County of Los Angeles Drawing No. 181-45-D1 dated 1959.

**Proposed Condition.** The proposed subdivision will include grading for the construction of eight (8) custom single-family residences, a hotel and associated street and utility improvements. Offsite runoff from the areas located south of the site, along with runoff from undeveloped portions of the site located along the southerly boundary, will surface flow as it does in its existing condition towards proposed sediment basins located along the southerly edge of the proposed private street. Runoff collected by these sediment basins will be conveyed in standpipes to the onsite storm drain system. The onsite storm drain system located along the easterly portion of the site will connect directly to the existing 66-in RCP storm drain line located along Hutton Drive.

Runoff from the majority of the proposed onsite private street area and the individual graded lots will be conveyed in a series of onsite storm drain lines. These lines will connect directly to the previously described onsite storm drain system connecting to the existing 66-in RCP storm drain line located in Hutton Drive. Runoff from Parcels 4 through 7 and a portion of Parcel 8 will surface flow in a northwesterly direction following pre-development runoff patterns. Rip-rap structures will be placed at the outlets of all storm drain lines within Parcels 4 through 7 to reduce velocities to non-erosive levels.

#### **b. Hydrologic Parameters:**

The hydrologic parameters were obtained from the Los Angeles County Department of Public Works Hydrology Manual, revised January 2006. The property is located on the Beverly Hills Hydrology Map (Fig. 1-H1.17, Appendix A). From this map, the soil number was determined to be 042, and the 50-year, 24-hour isohyet value was determined to be 7.3" for the drainage area. The percent impervious of 21% was determined based on the LA County Hydrology Manual's "Portion Impervious Data" chart for Low Density Single Family Residential (Figure 3, Appendix A) for the determination of runoff for the main subareas.

#### **c. Hydrologic Calculations:**

The above referenced County of Los Angeles Hydrology Manual and HydroCalc program were utilized in determining the existing and post-developed time of concentration and flow rate for the runoff which will be conveyed from the property and off-site areas. The property was divided into four subareas delineated based on their discharge points. Additionally, these subareas were further divided into smaller interior subareas in order to more

accurately determine flows at specific locations. The flow for the interior subareas was determined by multiplying the subarea size by the discharge per acre determined from the HydroCalc results. Calculations are included in Appendix B.

**Existing Conditions.** Preliminary calculations were conducted to determine the 50- and 100-year peak runoff generated from the site and the offsite tributary areas. Table 1 summarizes the total existing peak runoff from the site and tributaries. Figure 1 in Appendix C shows the existing drainage patterns.

| Table 1 – Existing Runoff   |         |
|-----------------------------|---------|
| Q50 =                       | 137 cfs |
| Q100 =                      | 166 cfs |
| Area (onsite and offsite) = | 44.1 ac |

**Developed Conditions.** A preliminary analysis was conducted to calculate the 50- and 100-year peak runoff for the developed site and the results are summarized in Table 2. Figure 2 in Appendix D shows proposed drainage features.

| Table 2 – Developed 50-Year Runoff |         |
|------------------------------------|---------|
| Q50 =                              | 139 cfs |
| Q100=                              | 168 cfs |
| Area (onsite and offsite) =        | 44.1 ac |

The increase in runoff generated from the proposed development will be mitigated onsite with the measures described in the following sections of this report.

#### 4. Detention Analysis

In order to reduce the developed conditions flow down to less than or equal to the existing conditions flow for the site, detention is required. The difference in flow is 1.66 cfs for the 50-year event and 2.0 cfs for the 100-year event. Two (2) detention tanks receiving runoff from the developed portions of areas 1A and 2A will be located within the site. Detention calculations show that by routing the flow through two (2) 10-ft wide by 25-ft deep tanks with a 10" orifice at the bottom, the flow leaving the area will be reduced by 2.4 cfs and 3.6 cfs for the 50- and 100-year storm events, respectively. Since the overall reduction of the flow leaving the site can be reduced to the existing level conditions by detaining the flow in these tanks, detention is not required for the other subareas. Calculations are included in Appendix B.

## 5. LID Calculations

Since this project consists of a one acre or greater of disturbed area and adding more than 10,000 sq. feet of impervious area, it is subject to LID requirements for All Other Development. In order to meet these requirements, the City of Los Angeles requires that the runoff from the impervious areas from the 85th percentile, 24-hour rain event or the  $\frac{3}{4}$  inch, 24-hour rain event, whichever is greater, be infiltrated, captured and reused, or at the least treated to remove contaminants.

The site topography makes the subject site infeasible for infiltration, because it is in a hillside area and could be subject to instability with the introduction of excess groundwater. Therefore, the following measures for the treatment and mitigation of stormwater are proposed:

- a. The runoff from each parcel designated for single family residence use would be self-contained such that each parcel would provide its own facilities for stormwater treatment and detention. A rainwater harvesting system will be installed on each single-family parcel to collect stormwater for reuse, thereby offsetting potable water demand and reducing pollutant loading on the onsite storm drain system. Runoff exceeding the storage volume from Parcels 1 through 3, and a portion of 8 will enter the onsite storm drain system discharging directly into the existing storm drain line along Hutton Drive. Riprap structures will be placed at the outlets from Lots 4 through 7 to minimize velocities to non-erosive levels. The rainwater harvesting would provide the necessary stormwater treatment and mitigation to meet City of Los Angeles LID requirements.
- b. Runoff from the private street and hotel development will be directed to a series of catch basins. Runoff collected in these catch basins will be diverted to rainwater harvesting systems located throughout the hotel parcel, which would irrigate landscaped areas adjacent to the private street.
- c. Runoff from the existing development to the east of the site, along with onsite runoff from the undeveloped areas west of the proposed private street, would flow toward one of two small sediment basins with standpipes. The purpose of these basins is to provide an area for sediment to accumulate before the stormwater enters the onsite storm drain system.

All measures presented in this section meet the City's LID requirements of mitigating 100% of the stormwater quality design flow, which corresponds to the 85th percentile, 24-hour runoff event, and insure that the total peak runoff leaving the site in its developed condition does not exceed the pre-developed peak runoff for the 50-year event. All rainwater harvesting cisterns will be permitted through the City of LA Bureau of Sanitation's LID department, as well as through the LA

County Health Department when a pump is used to pressurize the irrigation lines with water from the cistern. The cisterns and storm drains which will fill the cistern will be inspected during various phases of construction and a Stormwater Observation Report will be signed by the engineer responsible for the cistern design at the end of construction. All proposed common areas, which include the private street, would be privately maintained by the Homeowner's Association. A master covenant and agreement would be executed between the HOA and City agencies to ensure proper maintenance of all stormwater facilities.

The County of Los Angeles' HydroCalc program was used to compute the required rainwater harvesting tank sizes, per LA City and California State Regional Water Quality Control Board. Calculations are included in Appendix C and the LID Exhibit is included in Appendix D.

## **6. Discussion**

In conclusion, this report presents the conceptual NPDES and LID analysis for the proposed vesting Tentative Tract Map No. 74908. The proposed LID measures meet or exceed the NPDES and City of Los Angeles requirements for stormwater treatment and mitigation.

Based on the above, it is the opinion of this office the proposed vesting Tentative Tract Map No. 74908, would not have a negative impact on the existing drainage conditions of the subject site, tributary areas, and downslope areas, and would result in reduced sedimentation and pollutants conveyed to existing storm drain systems.

## **7. Limitations**

This report is prepared for use by 9712 Oak Pass Road, LLC and its authorized agents and should not be considered transferable. Prior to the use by others, the subject site and this report should be reviewed by this office to determine if any additional work is required to update this report. It is the intent of this report to aid in the design and construction of the described project. Implementation of the advice presented in this report is intended to reduce risk associated with construction projects. The professional opinions contained in this report are not intended to imply total performance of the project. Furthermore, the opinions contained within this report are based on the referenced materials.

This report has been prepared in accordance with generally accepted engineering practices and makes no warranties, either expressed or implied, as to the professional opinions provided.



4/4/2019  
9712 Oak Pass Road  
7171

Should you have any questions, please don't hesitate to call.

Respectfully submitted,

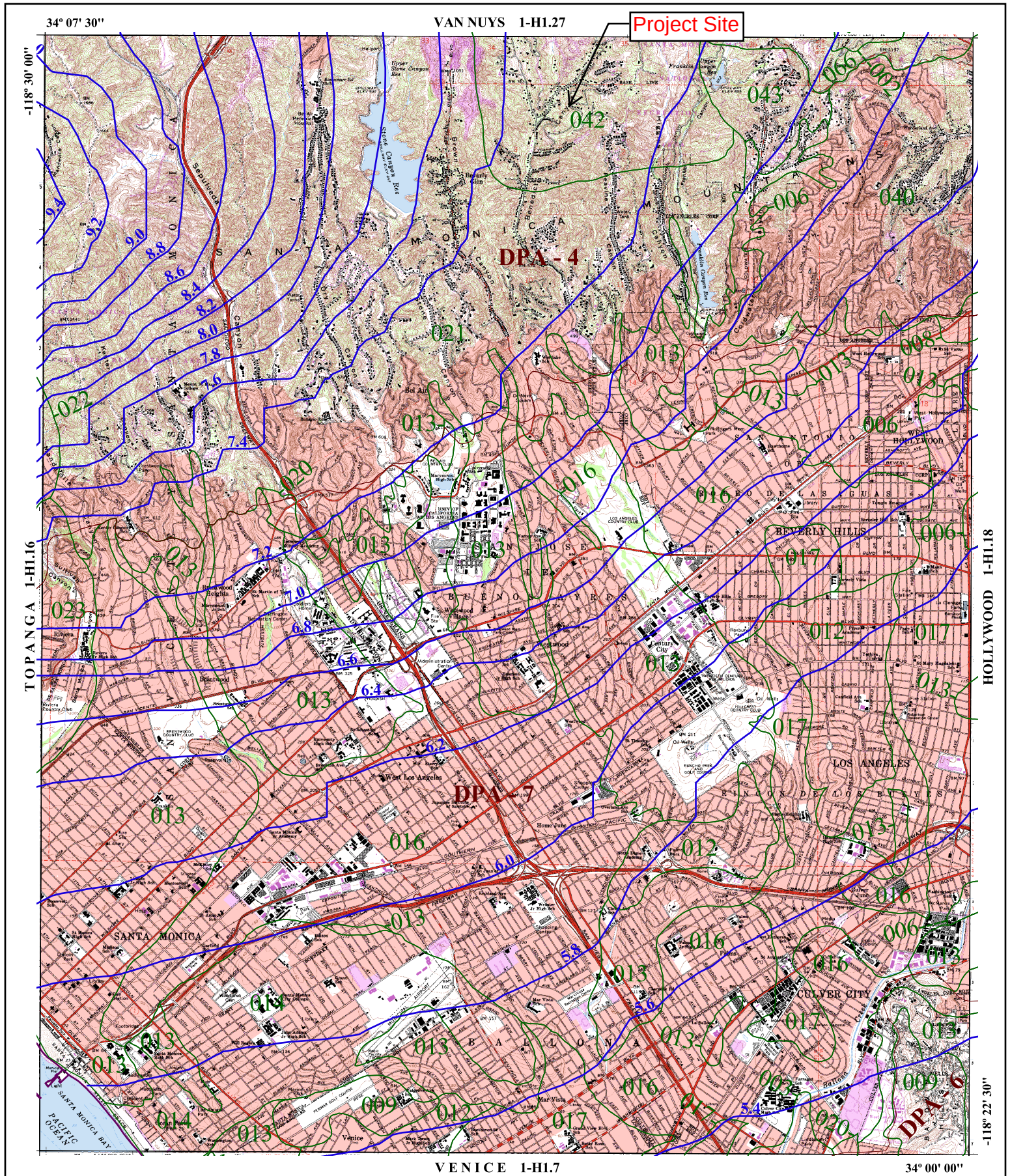


Leonard Liston  
President  
RCE 31902



# APPENDIX A





**016** SOIL CLASSIFICATION AREA

**7.2** INCHES OF RAINFALL

**DPA - 6** DEBRIS POTENTIAL AREA

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878  
 10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

## BEVERLY HILLS 50-YEAR 24-HOUR ISOHYET

1-H1.17



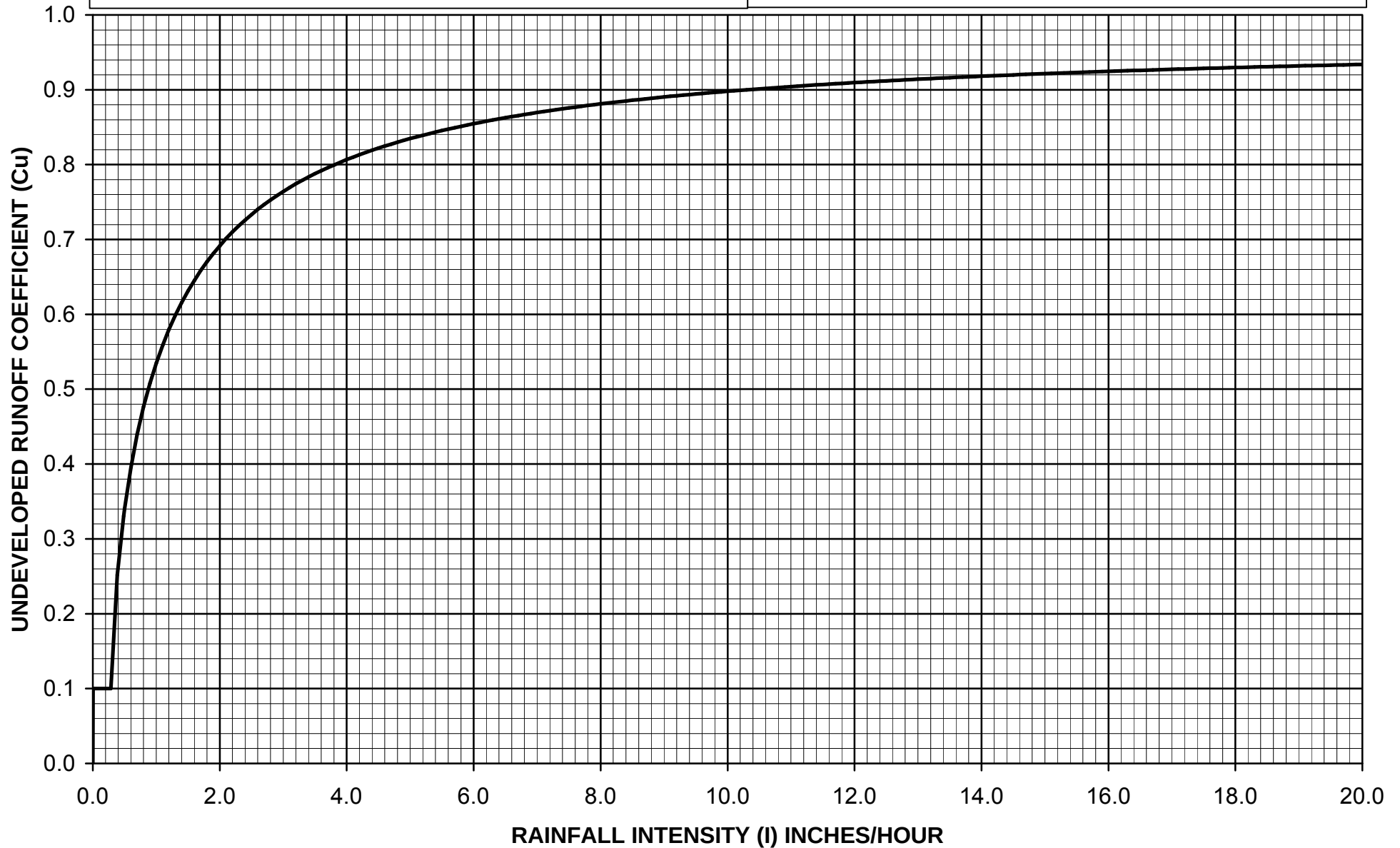


$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$   
 Where:  $C_D$  = Developed Runoff Coefficient  
           IMP = Proportion Impervious  
            $C_U$  = Undeveloped runoff coefficient



Los Angeles County Department of Public Works

## RUNOFF COEFFICIENT CURVE SOIL TYPE NO. 042



## Proportion Impervious Data

| <b>Code</b> | <b>Land Use Description</b>                                         | <b>% Impervious</b> |
|-------------|---------------------------------------------------------------------|---------------------|
| 1111        | High-Density Single Family Residential                              | 42                  |
| 1112        | Low-Density Single Family Residential                               | 21                  |
| 1121        | Mixed Multi-Family Residential                                      | 74                  |
| 1122        | Duplexes, Triplexes and 2-or 3-Unit Condominiums and Townhouses     | 55                  |
| 1123        | Low-Rise Apartments, Condominiums, and Townhouses                   | 86                  |
| 1124        | Medium-Rise Apartments and Condominiums                             | 86                  |
| 1125        | High-Rise Apartments and Condominiums                               | 90                  |
| 1131        | Trailer Parks and Mobile Home Courts, High-Density                  | 91                  |
| 1132        | Mobile Home Courts and Subdivisions, Low-Density                    | 42                  |
| 1140        | Mixed Residential                                                   | 59                  |
| 1151        | Rural Residential, High-Density                                     | 15                  |
| 1152        | Rural Residential, Low-Density                                      | 10                  |
| 1211        | Low- and Medium-Rise Major Office Use                               | 91                  |
| 1212        | High-Rise Major Office Use                                          | 91                  |
| 1213        | Skyscrapers                                                         | 91                  |
| 1221        | Regional Shopping Center                                            | 95                  |
| 1222        | Retail Centers (Non-Strip With Contiguous Interconnected Off-Street | 96                  |
| 1223        | Modern Strip Development                                            | 96                  |
| 1224        | Older Strip Development                                             | 97                  |
| 1231        | Commercial Storage                                                  | 90                  |
| 1232        | Commercial Recreation                                               | 90                  |
| 1233        | Hotels and Motels                                                   | 96                  |
| 1234        | Attended Pay Public Parking Facilities                              | 91                  |
| 1241        | Government Offices                                                  | 91                  |
| 1242        | Police and Sheriff Stations                                         | 91                  |
| 1243        | Fire Stations                                                       | 91                  |
| 1244        | Major Medical Health Care Facilities                                | 74                  |
| 1245        | Religious Facilities                                                | 82                  |
| 1246        | Other Public Facilities                                             | 91                  |
| 1247        | Non-Attended Public Parking Facilities                              | 91                  |
| 1251        | Correctional Facilities                                             | 91                  |
| 1252        | Special Care Facilities                                             | 74                  |
| 1253        | Other Special Use Facilities                                        | 86                  |
| 1261        | Pre-Schools/Day Care Centers                                        | 68                  |
| 1262        | Elementary Schools                                                  | 82                  |
| 1263        | Junior or Intermediate High Schools                                 | 82                  |
| 1264        | Senior High Schools                                                 | 82                  |
| 1265        | Colleges and Universities                                           | 47                  |
| 1266        | Trade Schools and Professional Training Facilities                  | 91                  |
| 1271        | Base (Built-up Area)                                                | 65                  |
| 1271.01     | Base High-Density Single Family Residential                         | 42                  |
| 1271.02     | Base Duplexes, Triplexes and 2-or 3-Unit Condominiums and T         | 55                  |

# **APPENDIX B**

## **Time of Concentration Calculations**

Existing Condition Runoff Summary

Soil Number: 42  
24-Hour 50-Year Rainfall Isohyet: 7.3

| Subarea Name | Area    |       | Elevation (ft) |            | Length (ft) | Slope    | Q50    | Q100   |
|--------------|---------|-------|----------------|------------|-------------|----------|--------|--------|
|              | sf      | ac    | Upstream       | Downstream |             |          | cfs    | cfs    |
| 1A           | 761176  | 17.47 | 1096           | 780        | 1334.86     | 0.236729 | 51.79  | 64.28  |
| 2A           | 715080  | 16.42 | 1096           | 796        | 1358.27     | 0.220869 | 48.81  | 60.54  |
| 3A           | 343419  | 7.88  | 1004           | 740        | 772.8       | 0.341615 | 28.02  | 32.04  |
| 4A           | 101009  | 2.32  | 1001.8         | 880        | 627.33      | 0.194156 | 8.25   | 9.43   |
| Total        | 1920683 | 44.09 |                |            |             |          | 136.87 | 166.30 |

Area 1A

q50 = 2.96 cfs/ac  
q100 = 3.68 cfs/ac

| Subarea Name |         | Area   |        | Q50 (cfs) | Q100 (cfs) |
|--------------|---------|--------|--------|-----------|------------|
|              |         | sf     | ac     |           |            |
| 1A(1)        | OFFSITE | 314053 | 7.210  | 21.369    | 26.522     |
| 1A(2)        | ONSITE  | 447123 | 10.265 | 37.760    | 37.760     |
|              | Total   | 761176 | 17.474 | 59.130    | 64.283     |

Area 2A

q50 = 2.97 cfs/ac  
q100 = 3.69 cfs/ac

| Subarea Name |         | Area   |       | Q50 (cfs) | Q100 (cfs) |
|--------------|---------|--------|-------|-----------|------------|
|              |         | sf     | ac    |           |            |
| 2A(1)        | OFFSITE | 182831 | 4.20  | 12.48     | 15.48      |
| 2A(2)        | ONSITE  | 532249 | 12.22 | 45.06     | 45.06      |
|              | Total   | 715080 | 16.42 | 57.54     | 60.54      |

Area 3A

q50 = 3.55 cfs/ac  
q100 = 4.06 cfs/ac

| Subarea Name |        | Area      |      | Q50 (cfs) | Q100 (cfs) |
|--------------|--------|-----------|------|-----------|------------|
|              |        | sf        | ac   |           |            |
| 3A           | ONSITE | 343418.70 | 7.88 | 28.02     | 32.04      |

Area 4A

q50 = 3.56 cfs/ac  
q100 = 4.07 cfs/ac

| Subarea Name |        | Area      |      | Q50 (cfs) | Q100 (cfs) |
|--------------|--------|-----------|------|-----------|------------|
|              |        | sf        | ac   |           |            |
| 4A           | ONSITE | 101009.00 | 2.32 | 8.25      | 9.43       |



Developed Condition Runoff Summary

Soil Number: 42  
24-Hour 50-Year Rainfall Isohyet: 7.3

| Subarea Name | Area     |       | Elevation (ft) |            | Length (ft) | Slope | Q50    | Q100   | Increase |        |
|--------------|----------|-------|----------------|------------|-------------|-------|--------|--------|----------|--------|
|              | sf       | ac    | Upstream       | Downstream |             |       | cfs    | cfs    | Q50      | Q100   |
| 1A           | 757406.3 | 17.39 | 1096           | 780        | 1334.9      | 0.24  | 52.90  | 65.24  | 1.10     | 0.96   |
| 2A           | 838378.3 | 19.25 | 1096           | 796        | 1084.9      | 0.28  | 58.55  | 72.22  | 9.75     | 11.68  |
| 3A           | 251371.2 | 5.77  | 960            | 740        | 772.8       | 0.28  | 20.94  | 23.85  | (7.08)   | (8.19) |
| 4A           | 73527.5  | 1.69  | 1001.8         | 880        | 520.69      | 0.23  | 6.13   | 6.99   | (2.12)   | (2.45) |
| Total        | 1920683  | 44.09 | 992            | 892        | 167.06      | 0.60  | 138.53 | 168.30 | 1.66     | 2.00   |

1920683

Area 1A

q50 = 3.04 cfs/ac  
q100 = 3.75 cfs/ac

| Subarea Name |             | Area    |       | Q50 (cfs) | Q100 (cfs) |
|--------------|-------------|---------|-------|-----------|------------|
|              |             | sf      | ac    |           |            |
| 1A(1)        | OFFSITE     | 35409.1 | 0.81  | 2.47      | 3.05       |
| 1A(2)        | OFFSITE     | 164128  | 3.77  | 11.46     | 14.14      |
| 1A(3)        | OFFSITE     | 114245  | 2.62  | 7.98      | 9.84       |
| 1A(4)        | STREET      | 32381.5 | 0.74  | 2.26      | 2.79       |
| 1A(5)        | SITE        | 165666  | 3.80  | 11.57     | 14.27      |
| 1A(6)        | SITE        | 134388  | 3.09  | 9.39      | 11.58      |
| 1A(7)        | STREET      | 15018.4 | 0.34  | 1.05      | 1.29       |
| 1A(8)        | STREET      | 8060.13 | 0.19  | 0.56      | 0.69       |
| 1A(9)        | STREET      | 9488.75 | 0.22  | 0.66      | 0.82       |
| 1A(10)       | STREET      | 7214.19 | 0.17  | 0.50      | 0.62       |
| 1A(11)       | STREET FLOW | 40261.1 | 0.92  | 2.81      | 3.47       |
| 1A(12)       | SITE/LS     | 6264.98 | 0.14  | 0.44      | 0.54       |
| 1A(13)       | SITE/LS     | 1694.02 | 0.04  | 0.12      | 0.15       |
| 1A(14)       | LS/STREET   | 16240.1 | 0.37  | 1.13      | 1.40       |
| 1A(15)       | STREET      | 6946.12 | 0.16  | 0.49      | 0.60       |
| Total        |             | 757406  | 17.39 | 52.90     | 65.24      |

Area 2A

q50 = 3.04 cfs/ac  
q100 = 3.75 cfs/ac

| Subarea Name |          | Area    |       | Q50 (cfs) | Q100 (cfs) |
|--------------|----------|---------|-------|-----------|------------|
|              |          | sf      | ac    |           |            |
| 2A(1)        | OFFSITE  | 70267.4 | 1.61  | 4.91      | 6.05       |
| 2A(2)        | OFFSITE  | 50855.1 | 1.17  | 3.55      | 4.38       |
| 2A(3)        | OFFSITE  | 61708.5 | 1.42  | 4.31      | 5.32       |
| 2A(4)        | SITE/LS  | 11337.4 | 0.26  | 0.79      | 0.98       |
| 2A(5)        | SITE     | 22812.4 | 0.52  | 1.59      | 1.97       |
| 2A(6)        | PARCEL 8 | 85898.8 | 1.97  | 6.00      | 7.40       |
| 2A(7)        | PARCEL 8 | 68633.6 | 1.58  | 4.79      | 5.91       |
| 2A(8)        | PARCEL 1 | 60410.6 | 1.39  | 4.22      | 5.20       |
| 2A(9)        | PARCEL 2 | 61910.1 | 1.42  | 4.32      | 5.33       |
| 2A(10)       | PARCEL 3 | 56791.4 | 1.30  | 3.97      | 4.89       |
| 2A(11)       | STREET   | 12052.8 | 0.28  | 0.84      | 1.04       |
| 2A(12)       | STREET   | 11492.6 | 0.26  | 0.80      | 0.99       |
| 2A(13)       | STREET   | 5193.42 | 0.12  | 0.36      | 0.45       |
| 2A(14)       | STREET   | 5510.68 | 0.13  | 0.38      | 0.47       |
| 2A(15)       | STREET   | 5762.65 | 0.13  | 0.40      | 0.50       |
| 2A(16)       | STREET   | 19147.4 | 0.44  | 1.34      | 1.65       |
| 2A(17)       | STREET   | 5761.3  | 0.13  | 0.40      | 0.50       |
| 2A(18)       | STREET   | 6076.35 | 0.14  | 0.42      | 0.52       |
| 2A(19)       | STREET   | 6893.98 | 0.16  | 0.48      | 0.59       |
| 2A(20)       | STREET   | 4575.33 | 0.11  | 0.32      | 0.39       |
| 2A(21)       | LS/      | 27746.3 | 0.64  | 1.94      | 2.39       |
| 2A(22)       | LS/      | 102731  | 2.36  | 7.18      | 8.85       |
| 2A(23)       | STREET   | 8260.06 | 0.19  | 0.58      | 0.71       |
| 2A(24)       | STREET   | 9031.83 | 0.21  | 0.63      | 0.78       |
| 2A(25)       | STREET   | 7578.8  | 0.17  | 0.53      | 0.65       |
| 2A(26)       | SITE     | 49938.4 | 1.15  | 3.49      | 4.30       |
| Total        |          | 838378  | 19.25 | 58.55     | 72.22      |

Area 3A

q50 = 3.63 cfs/ac  
q100 = 4.13 cfs/ac

| Subarea Name |          | Area      |      | Q50 (cfs) | Q100 (cfs) |
|--------------|----------|-----------|------|-----------|------------|
|              |          | sf        | ac   |           |            |
| 3A(1)        | PARCEL 4 | 65190.36  | 1.50 | 5.43      | 6.18       |
| 3A(2)        | PARCEL 5 | 63743.93  | 1.46 | 5.31      | 6.05       |
| 3A(3)        | PARCEL 6 | 67207.79  | 1.54 | 5.60      | 6.38       |
| 3A(4)        | PARCEL 7 | 55262.02  | 1.27 | 4.60      | 5.24       |
| Total        |          | 251404.10 | 5.77 | 20.95     | 23.85      |

Area 4A

q50 = 3.63 cfs/ac  
q100 = 4.14 cfs/ac

| Subarea Name |          | Area     |      | Q50 (cfs) | Q100 (cfs) |
|--------------|----------|----------|------|-----------|------------|
|              |          | sf       | ac   |           |            |
| 4A(1)        | PARCEL 8 | 61797.60 | 1.42 | 5.16      | 5.87       |
| 4A(2)        | SITE/LS  | 11729.90 | 0.27 | 0.98      | 1.11       |
| TOTAL        |          | 73527.50 | 1.69 | 6.13      | 6.99       |

## Peak Flow Hydrologic Analysis

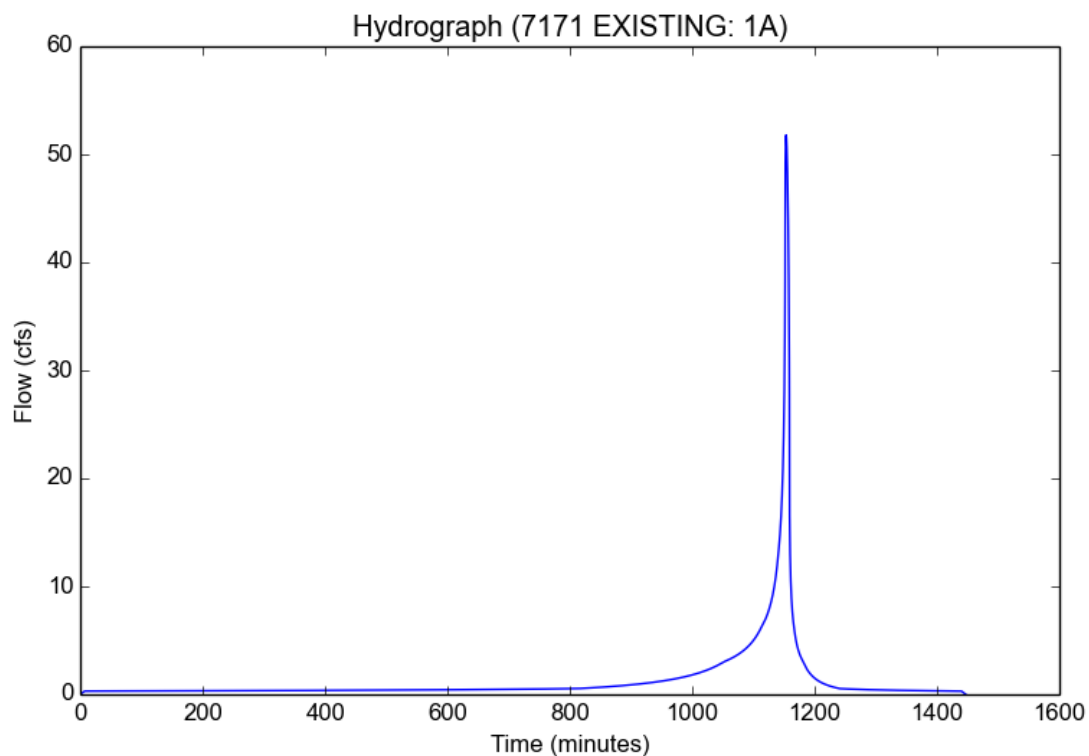
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Version: HydroCalc 0.3.1

### Input Parameters

|                           |               |
|---------------------------|---------------|
| Project Name              | 7171 EXISTING |
| Subarea ID                | 1A            |
| Area (ac)                 | 17.47         |
| Flow Path Length (ft)     | 1334.86       |
| Flow Path Slope (vft/hft) | 0.24          |
| 50-yr Rainfall Depth (in) | 7.3           |
| Percent Impervious        | 0.01          |
| Soil Type                 | 42            |
| Design Storm Frequency    | 50-yr         |
| Fire Factor               | 0             |
| LID                       | False         |

### Output Results

|                                     |             |
|-------------------------------------|-------------|
| Modeled (50-yr) Rainfall Depth (in) | 7.3         |
| Peak Intensity (in/hr)              | 3.7183      |
| Undeveloped Runoff Coefficient (Cu) | 0.7963      |
| Developed Runoff Coefficient (Cd)   | 0.7973      |
| Time of Concentration (min)         | 7.0         |
| Clear Peak Flow Rate (cfs)          | 51.7928     |
| Burned Peak Flow Rate (cfs)         | 51.7928     |
| 24-Hr Clear Runoff Volume (ac-ft)   | 2.6788      |
| 24-Hr Clear Runoff Volume (cu-ft)   | 116686.5233 |



## Peak Flow Hydrologic Analysis

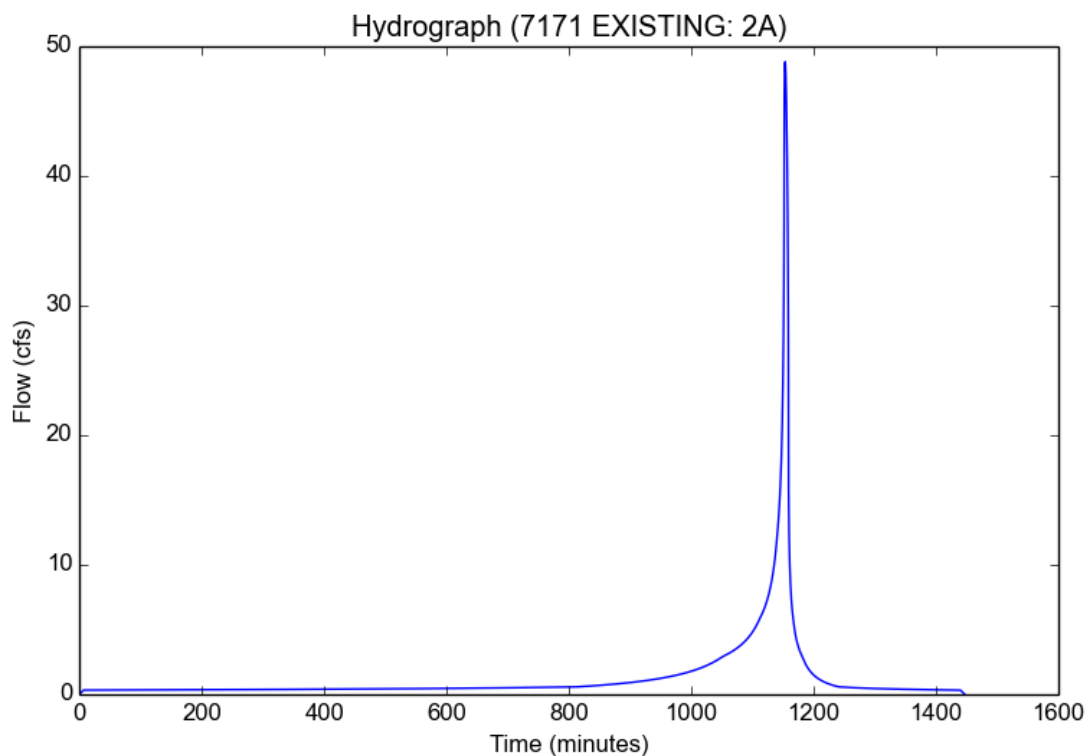
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171\_Q50 Q100 R  
Version: HydroCalc 0.3.1

### Input Parameters

|                           |               |
|---------------------------|---------------|
| Project Name              | 7171 EXISTING |
| Subarea ID                | 2A            |
| Area (ac)                 | 16.42         |
| Flow Path Length (ft)     | 1358.27       |
| Flow Path Slope (vft/hft) | 0.22          |
| 50-yr Rainfall Depth (in) | 7.3           |
| Percent Impervious        | 0.03          |
| Soil Type                 | 42            |
| Design Storm Frequency    | 50-yr         |
| Fire Factor               | 0             |
| LID                       | False         |

### Output Results

|                                     |             |
|-------------------------------------|-------------|
| Modeled (50-yr) Rainfall Depth (in) | 7.3         |
| Peak Intensity (in/hr)              | 3.7183      |
| Undeveloped Runoff Coefficient (Cu) | 0.7963      |
| Developed Runoff Coefficient (Cd)   | 0.7994      |
| Time of Concentration (min)         | 7.0         |
| Clear Peak Flow Rate (cfs)          | 48.8065     |
| Burned Peak Flow Rate (cfs)         | 48.8065     |
| 24-Hr Clear Runoff Volume (ac-ft)   | 2.647       |
| 24-Hr Clear Runoff Volume (cu-ft)   | 115303.4662 |



## Peak Flow Hydrologic Analysis

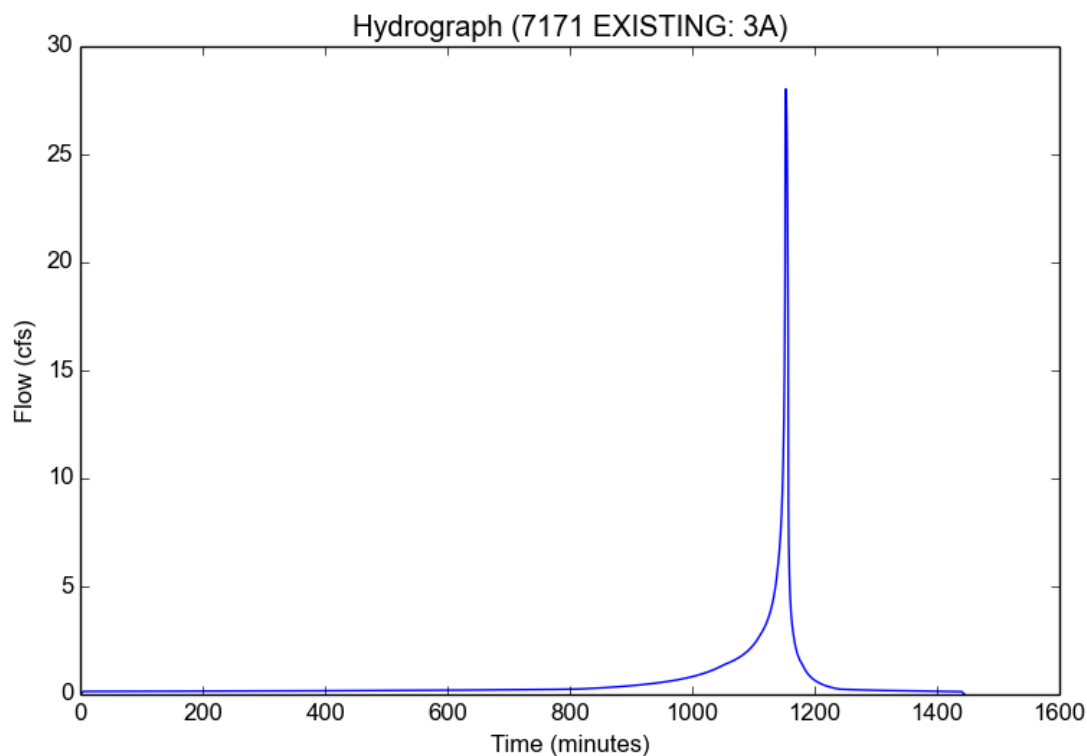
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171\_Q50 Q100 R  
Version: HydroCalc 0.3.1

### Input Parameters

|                           |               |
|---------------------------|---------------|
| Project Name              | 7171 EXISTING |
| Subarea ID                | 3A            |
| Area (ac)                 | 7.88          |
| Flow Path Length (ft)     | 772.8         |
| Flow Path Slope (vft/hft) | 0.34          |
| 50-yr Rainfall Depth (in) | 7.3           |
| Percent Impervious        | 0.01          |
| Soil Type                 | 42            |
| Design Storm Frequency    | 50-yr         |
| Fire Factor               | 0             |
| LID                       | False         |

### Output Results

|                                     |            |
|-------------------------------------|------------|
| Modeled (50-yr) Rainfall Depth (in) | 7.3        |
| Peak Intensity (in/hr)              | 4.3554     |
| Undeveloped Runoff Coefficient (Cu) | 0.8157     |
| Developed Runoff Coefficient (Cd)   | 0.8165     |
| Time of Concentration (min)         | 5.0        |
| Clear Peak Flow Rate (cfs)          | 28.024     |
| Burned Peak Flow Rate (cfs)         | 28.024     |
| 24-Hr Clear Runoff Volume (ac-ft)   | 1.2094     |
| 24-Hr Clear Runoff Volume (cu-ft)   | 52681.8078 |



## Peak Flow Hydrologic Analysis

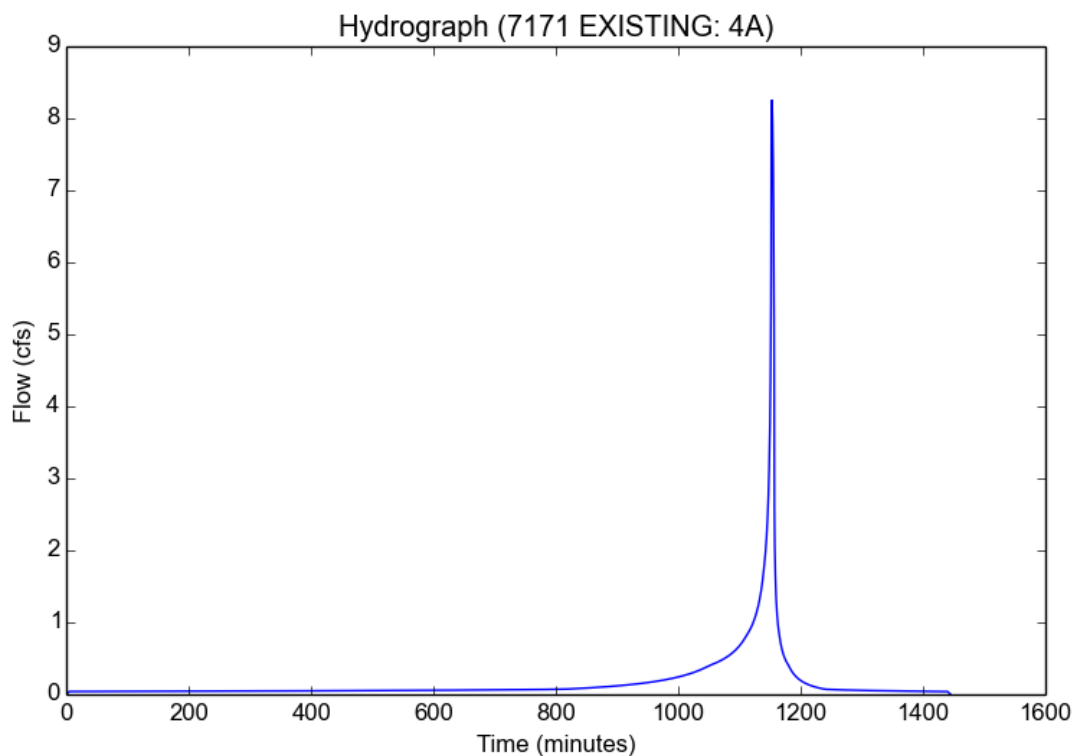
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171\_Q50 Q100 R  
Version: HydroCalc 0.3.1

### Input Parameters

|                           |               |
|---------------------------|---------------|
| Project Name              | 7171 EXISTING |
| Subarea ID                | 4A            |
| Area (ac)                 | 2.32          |
| Flow Path Length (ft)     | 627.33        |
| Flow Path Slope (vft/hft) | 0.19          |
| 50-yr Rainfall Depth (in) | 7.3           |
| Percent Impervious        | 0.01          |
| Soil Type                 | 42            |
| Design Storm Frequency    | 50-yr         |
| Fire Factor               | 0             |
| LID                       | False         |

### Output Results

|                                     |          |
|-------------------------------------|----------|
| Modeled (50-yr) Rainfall Depth (in) | 7.3      |
| Peak Intensity (in/hr)              | 4.3554   |
| Undeveloped Runoff Coefficient (Cu) | 0.8157   |
| Developed Runoff Coefficient (Cd)   | 0.8165   |
| Time of Concentration (min)         | 5.0      |
| Clear Peak Flow Rate (cfs)          | 8.2507   |
| Burned Peak Flow Rate (cfs)         | 8.2507   |
| 24-Hr Clear Runoff Volume (ac-ft)   | 0.3561   |
| 24-Hr Clear Runoff Volume (cu-ft)   | 15510.38 |



## Peak Flow Hydrologic Analysis

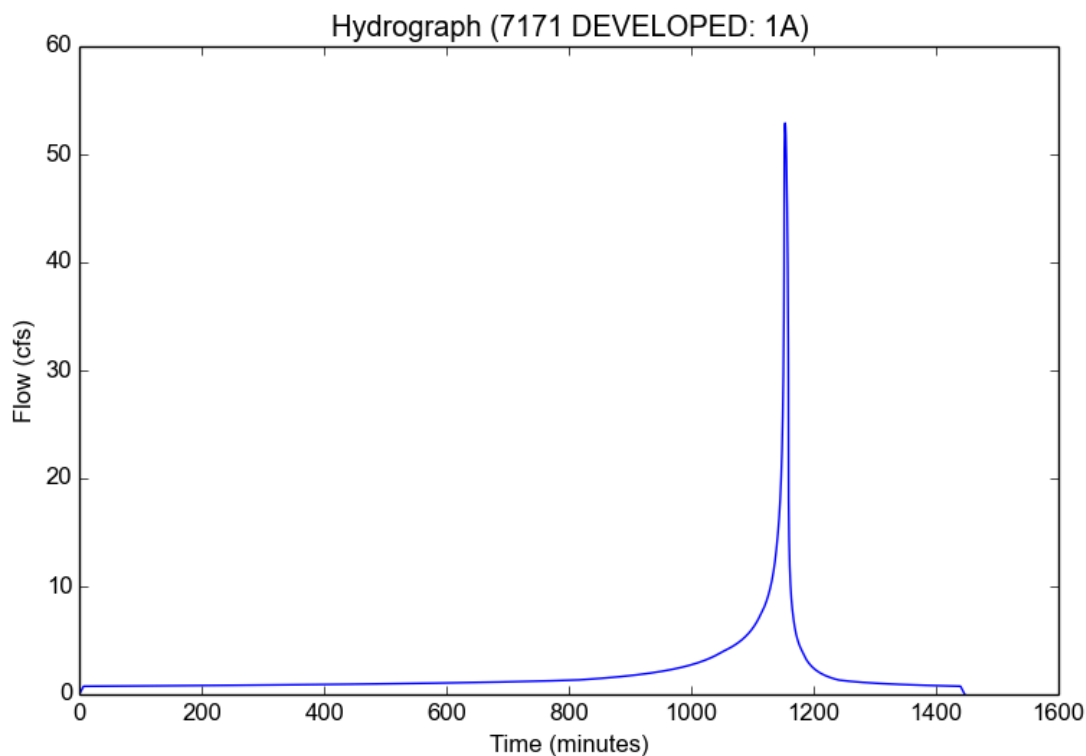
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171\_Q50 Q100 R  
Version: HydroCalc 0.3.1

### Input Parameters

|                           |                |
|---------------------------|----------------|
| Project Name              | 7171 DEVELOPED |
| Subarea ID                | 1A             |
| Area (ac)                 | 17.39          |
| Flow Path Length (ft)     | 1334.86        |
| Flow Path Slope (vft/hft) | 0.24           |
| 50-yr Rainfall Depth (in) | 7.3            |
| Percent Impervious        | 0.21           |
| Soil Type                 | 42             |
| Design Storm Frequency    | 50-yr          |
| Fire Factor               | 0              |
| LID                       | False          |

### Output Results

|                                     |             |
|-------------------------------------|-------------|
| Modeled (50-yr) Rainfall Depth (in) | 7.3         |
| Peak Intensity (in/hr)              | 3.7183      |
| Undeveloped Runoff Coefficient (Cu) | 0.7963      |
| Developed Runoff Coefficient (Cd)   | 0.8181      |
| Time of Concentration (min)         | 7.0         |
| Clear Peak Flow Rate (cfs)          | 52.8969     |
| Burned Peak Flow Rate (cfs)         | 52.8969     |
| 24-Hr Clear Runoff Volume (ac-ft)   | 4.0353      |
| 24-Hr Clear Runoff Volume (cu-ft)   | 175779.7286 |



## Peak Flow Hydrologic Analysis

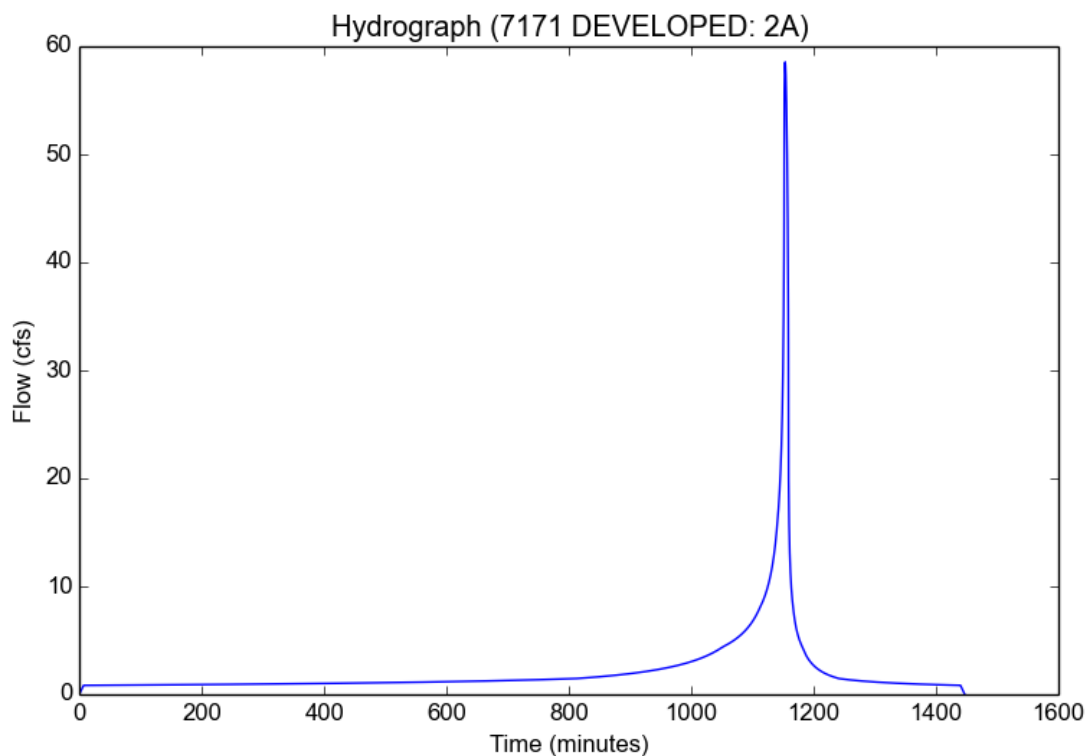
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171\_Q50 Q100 R  
Version: HydroCalc 0.3.1

### Input Parameters

|                           |                |
|---------------------------|----------------|
| Project Name              | 7171 DEVELOPED |
| Subarea ID                | 2A             |
| Area (ac)                 | 19.25          |
| Flow Path Length (ft)     | 1358.27        |
| Flow Path Slope (vft/hft) | 0.22           |
| 50-yr Rainfall Depth (in) | 7.3            |
| Percent Impervious        | 0.21           |
| Soil Type                 | 42             |
| Design Storm Frequency    | 50-yr          |
| Fire Factor               | 0              |
| LID                       | False          |

### Output Results

|                                     |             |
|-------------------------------------|-------------|
| Modeled (50-yr) Rainfall Depth (in) | 7.3         |
| Peak Intensity (in/hr)              | 3.7183      |
| Undeveloped Runoff Coefficient (Cu) | 0.7963      |
| Developed Runoff Coefficient (Cd)   | 0.8181      |
| Time of Concentration (min)         | 7.0         |
| Clear Peak Flow Rate (cfs)          | 58.5547     |
| Burned Peak Flow Rate (cfs)         | 58.5547     |
| 24-Hr Clear Runoff Volume (ac-ft)   | 4.467       |
| 24-Hr Clear Runoff Volume (cu-ft)   | 194580.7807 |



## Peak Flow Hydrologic Analysis

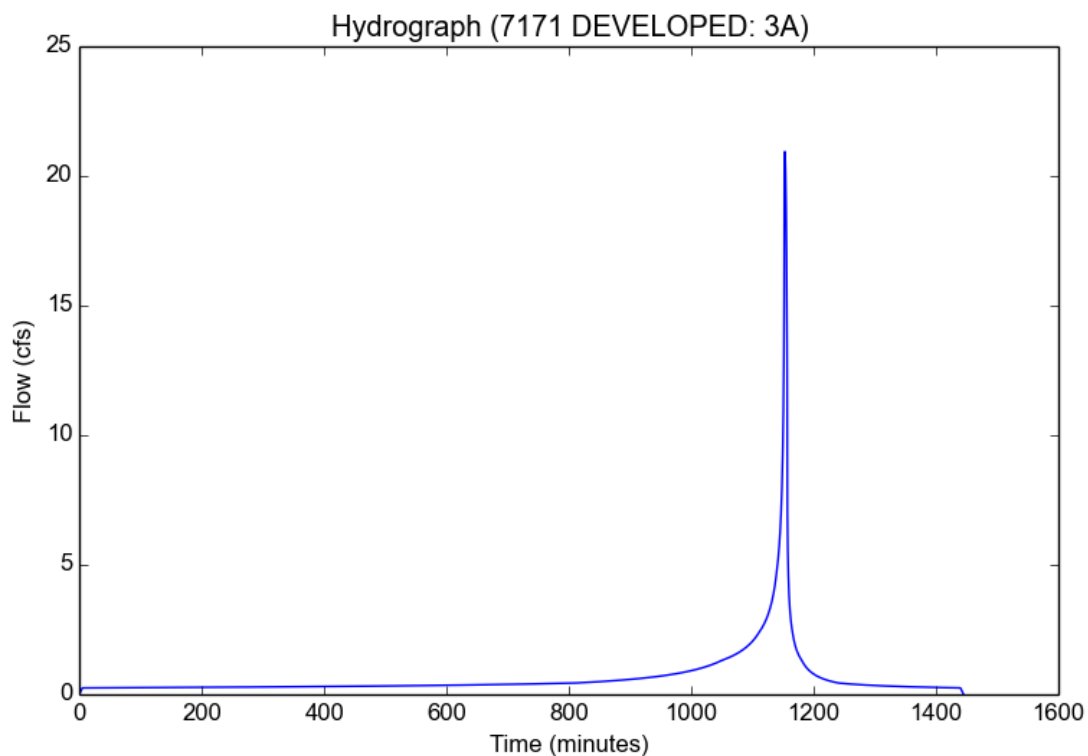
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Version: HydroCalc 0.3.1

### Input Parameters

|                           |                |
|---------------------------|----------------|
| Project Name              | 7171 DEVELOPED |
| Subarea ID                | 3A             |
| Area (ac)                 | 5.77           |
| Flow Path Length (ft)     | 772.8          |
| Flow Path Slope (vft/hft) | 0.34           |
| 50-yr Rainfall Depth (in) | 7.3            |
| Percent Impervious        | 0.21           |
| Soil Type                 | 42             |
| Design Storm Frequency    | 50-yr          |
| Fire Factor               | 0              |
| LID                       | False          |

### Output Results

|                                     |            |
|-------------------------------------|------------|
| Modeled (50-yr) Rainfall Depth (in) | 7.3        |
| Peak Intensity (in/hr)              | 4.3554     |
| Undeveloped Runoff Coefficient (Cu) | 0.8157     |
| Developed Runoff Coefficient (Cd)   | 0.8334     |
| Time of Concentration (min)         | 5.0        |
| Clear Peak Flow Rate (cfs)          | 20.9438    |
| Burned Peak Flow Rate (cfs)         | 20.9438    |
| 24-Hr Clear Runoff Volume (ac-ft)   | 1.3396     |
| 24-Hr Clear Runoff Volume (cu-ft)   | 58352.4954 |





## Peak Flow Hydrologic Analysis

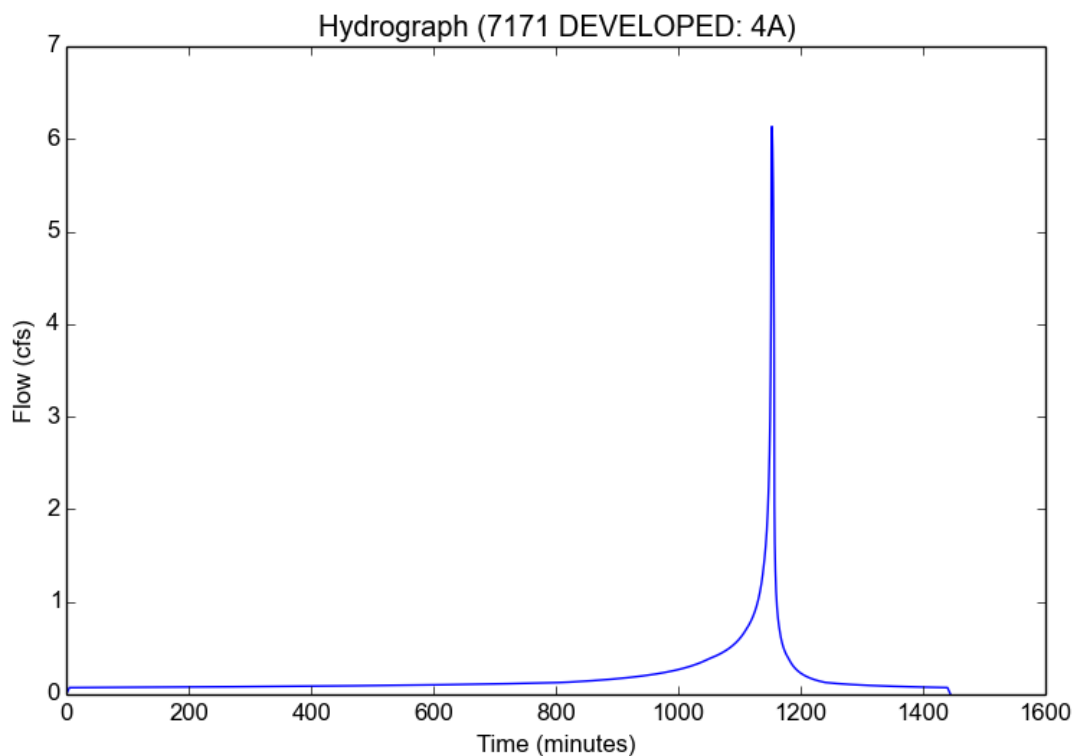
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Version: HydroCalc 0.3.1

### Input Parameters

|                           |                |
|---------------------------|----------------|
| Project Name              | 7171 DEVELOPED |
| Subarea ID                | 4A             |
| Area (ac)                 | 1.69           |
| Flow Path Length (ft)     | 627.33         |
| Flow Path Slope (vft/hft) | 0.19           |
| 50-yr Rainfall Depth (in) | 7.3            |
| Percent Impervious        | 0.21           |
| Soil Type                 | 42             |
| Design Storm Frequency    | 50-yr          |
| Fire Factor               | 0              |
| LID                       | False          |

### Output Results

|                                     |            |
|-------------------------------------|------------|
| Modeled (50-yr) Rainfall Depth (in) | 7.3        |
| Peak Intensity (in/hr)              | 4.3554     |
| Undeveloped Runoff Coefficient (Cu) | 0.8157     |
| Developed Runoff Coefficient (Cd)   | 0.8334     |
| Time of Concentration (min)         | 5.0        |
| Clear Peak Flow Rate (cfs)          | 6.1343     |
| Burned Peak Flow Rate (cfs)         | 6.1343     |
| 24-Hr Clear Runoff Volume (ac-ft)   | 0.3924     |
| 24-Hr Clear Runoff Volume (cu-ft)   | 17091.1122 |



## Peak Flow Hydrologic Analysis

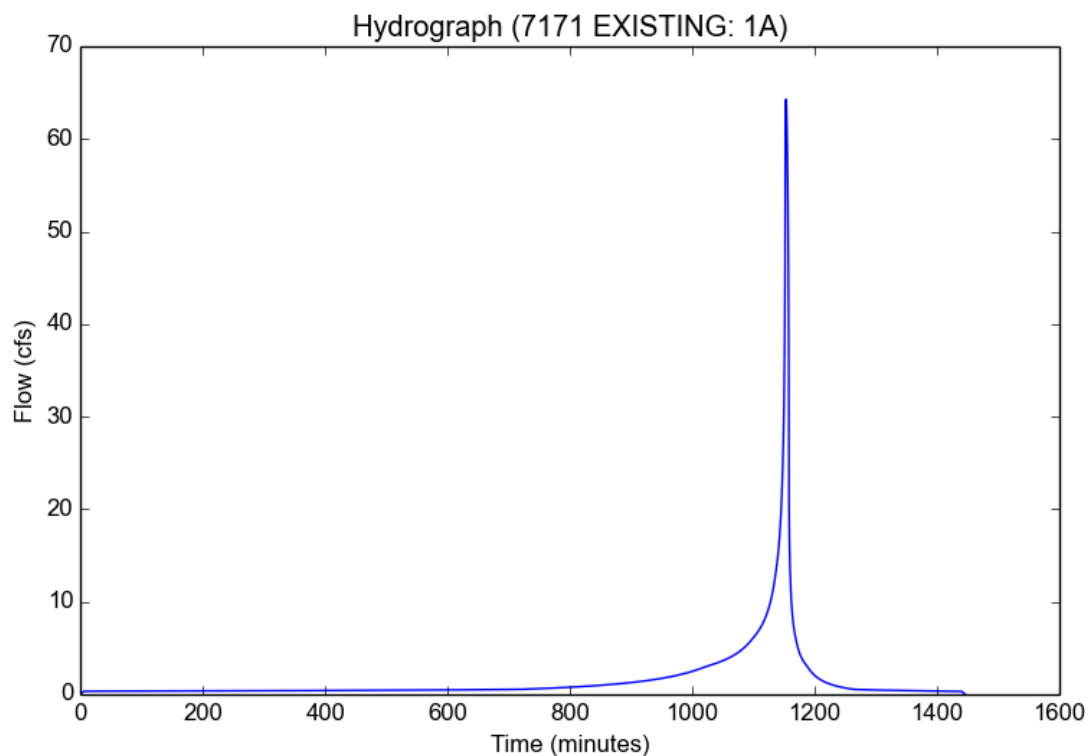
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Version: HydroCalc 0.3.1

### Input Parameters

|                           |               |
|---------------------------|---------------|
| Project Name              | 7171 EXISTING |
| Subarea ID                | 1A            |
| Area (ac)                 | 17.47         |
| Flow Path Length (ft)     | 1334.86       |
| Flow Path Slope (vft/hft) | 0.24          |
| 50-yr Rainfall Depth (in) | 7.3           |
| Percent Impervious        | 0.01          |
| Soil Type                 | 42            |
| Design Storm Frequency    | 100-yr        |
| Fire Factor               | 0             |
| LID                       | False         |

### Output Results

|                                      |            |
|--------------------------------------|------------|
| Modeled (100-yr) Rainfall Depth (in) | 8.1906     |
| Peak Intensity (in/hr)               | 4.4854     |
| Undeveloped Runoff Coefficient (Cu)  | 0.8195     |
| Developed Runoff Coefficient (Cd)    | 0.8203     |
| Time of Concentration (min)          | 6.0        |
| Clear Peak Flow Rate (cfs)           | 64.2828    |
| Burned Peak Flow Rate (cfs)          | 64.2828    |
| 24-Hr Clear Runoff Volume (ac-ft)    | 3.2488     |
| 24-Hr Clear Runoff Volume (cu-ft)    | 141517.522 |



## Peak Flow Hydrologic Analysis

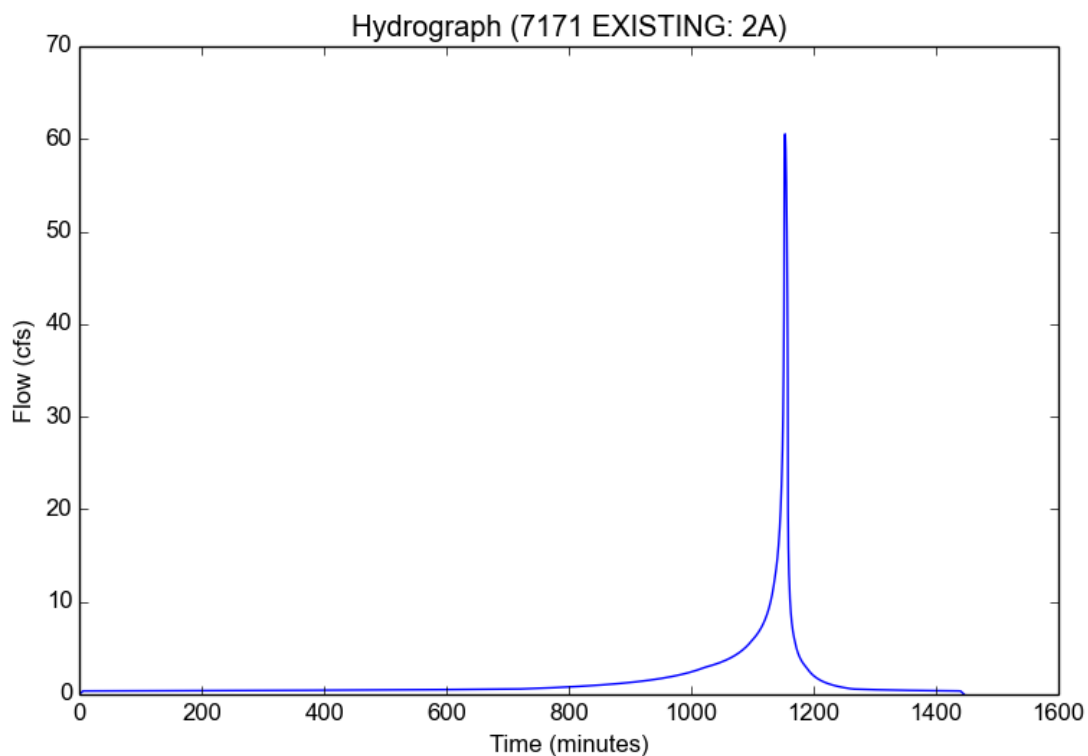
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Version: HydroCalc 0.3.1

### Input Parameters

|                           |               |
|---------------------------|---------------|
| Project Name              | 7171 EXISTING |
| Subarea ID                | 2A            |
| Area (ac)                 | 16.42         |
| Flow Path Length (ft)     | 1358.27       |
| Flow Path Slope (vft/hft) | 0.22          |
| 50-yr Rainfall Depth (in) | 7.3           |
| Percent Impervious        | 0.03          |
| Soil Type                 | 42            |
| Design Storm Frequency    | 100-yr        |
| Fire Factor               | 0             |
| LID                       | False         |

### Output Results

|                                      |             |
|--------------------------------------|-------------|
| Modeled (100-yr) Rainfall Depth (in) | 8.1906      |
| Peak Intensity (in/hr)               | 4.4854      |
| Undeveloped Runoff Coefficient (Cu)  | 0.8195      |
| Developed Runoff Coefficient (Cd)    | 0.822       |
| Time of Concentration (min)          | 6.0         |
| Clear Peak Flow Rate (cfs)           | 60.5377     |
| Burned Peak Flow Rate (cfs)          | 60.5377     |
| 24-Hr Clear Runoff Volume (ac-ft)    | 3.1939      |
| 24-Hr Clear Runoff Volume (cu-ft)    | 139127.7437 |



## Peak Flow Hydrologic Analysis

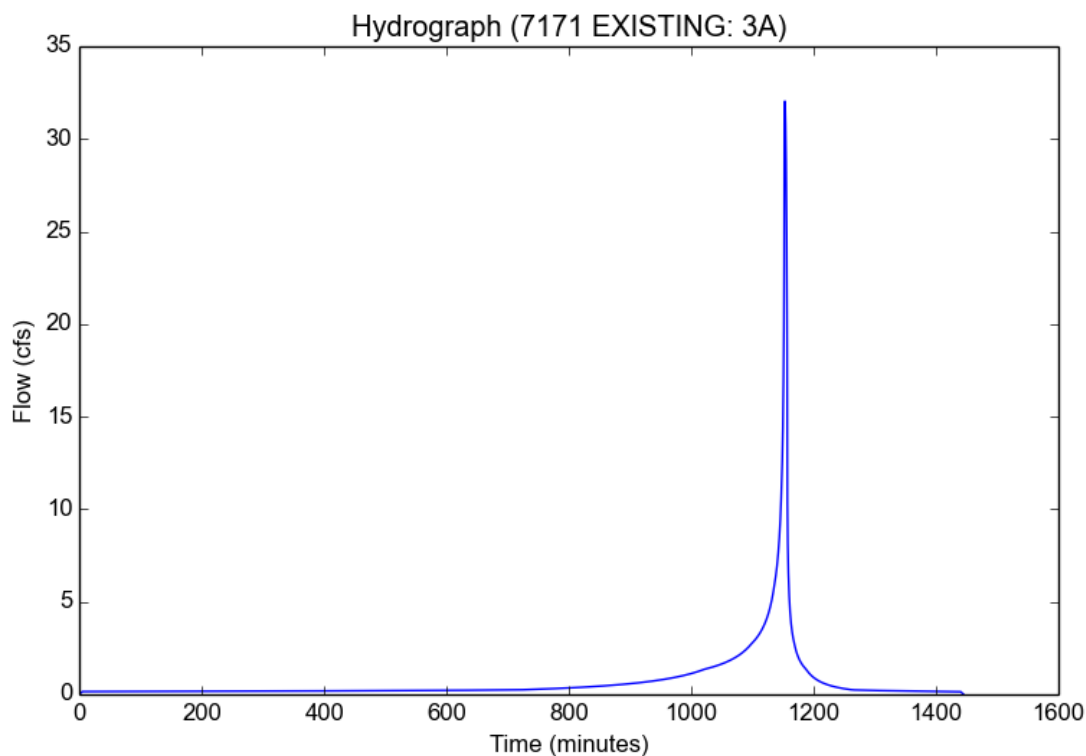
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Version: HydroCalc 0.3.1

### Input Parameters

|                           |               |
|---------------------------|---------------|
| Project Name              | 7171 EXISTING |
| Subarea ID                | 3A            |
| Area (ac)                 | 7.88          |
| Flow Path Length (ft)     | 772.8         |
| Flow Path Slope (vft/hft) | 0.34          |
| 50-yr Rainfall Depth (in) | 7.3           |
| Percent Impervious        | 0.01          |
| Soil Type                 | 42            |
| Design Storm Frequency    | 100-yr        |
| Fire Factor               | 0             |
| LID                       | False         |

### Output Results

|                                      |            |
|--------------------------------------|------------|
| Modeled (100-yr) Rainfall Depth (in) | 8.1906     |
| Peak Intensity (in/hr)               | 4.8867     |
| Undeveloped Runoff Coefficient (Cu)  | 0.8314     |
| Developed Runoff Coefficient (Cd)    | 0.8321     |
| Time of Concentration (min)          | 5.0        |
| Clear Peak Flow Rate (cfs)           | 32.0419    |
| Burned Peak Flow Rate (cfs)          | 32.0419    |
| 24-Hr Clear Runoff Volume (ac-ft)    | 1.4661     |
| 24-Hr Clear Runoff Volume (cu-ft)    | 63864.0097 |



## Peak Flow Hydrologic Analysis

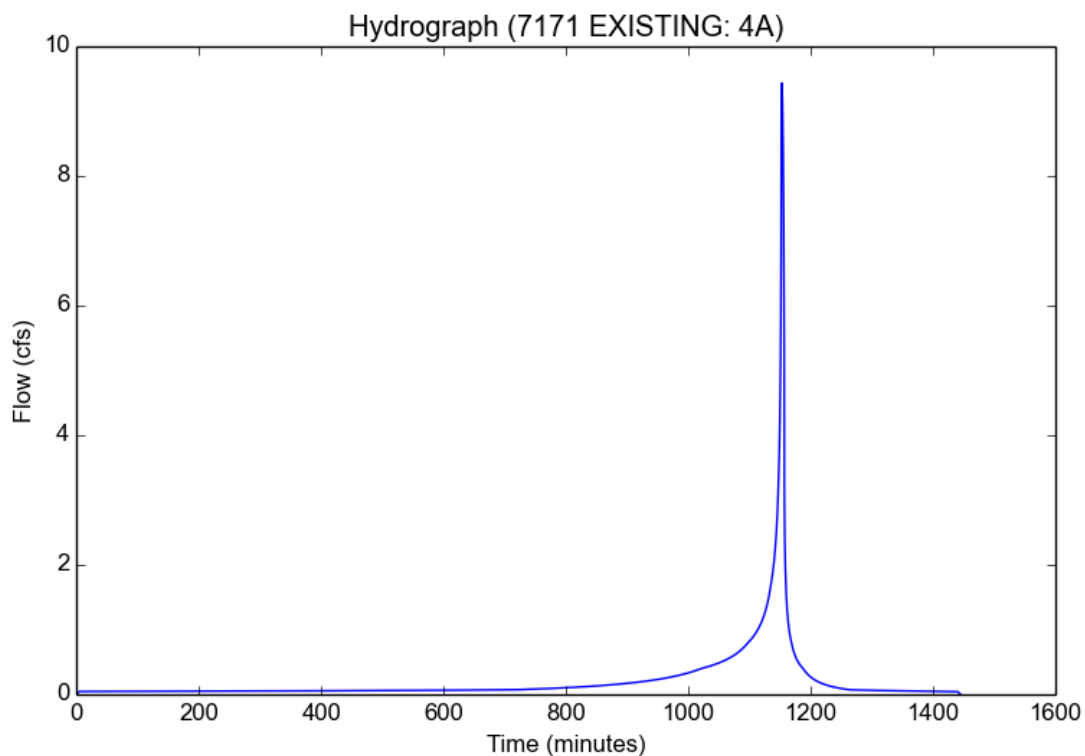
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171\_Q50 Q100 R  
Version: HydroCalc 0.3.1

### Input Parameters

|                           |               |
|---------------------------|---------------|
| Project Name              | 7171 EXISTING |
| Subarea ID                | 4A            |
| Area (ac)                 | 2.32          |
| Flow Path Length (ft)     | 627.33        |
| Flow Path Slope (vft/hft) | 0.19          |
| 50-yr Rainfall Depth (in) | 7.3           |
| Percent Impervious        | 0.01          |
| Soil Type                 | 42            |
| Design Storm Frequency    | 100-yr        |
| Fire Factor               | 0             |
| LID                       | False         |

### Output Results

|                                      |            |
|--------------------------------------|------------|
| Modeled (100-yr) Rainfall Depth (in) | 8.1906     |
| Peak Intensity (in/hr)               | 4.8867     |
| Undeveloped Runoff Coefficient (Cu)  | 0.8314     |
| Developed Runoff Coefficient (Cd)    | 0.8321     |
| Time of Concentration (min)          | 5.0        |
| Clear Peak Flow Rate (cfs)           | 9.4337     |
| Burned Peak Flow Rate (cfs)          | 9.4337     |
| 24-Hr Clear Runoff Volume (ac-ft)    | 0.4316     |
| 24-Hr Clear Runoff Volume (cu-ft)    | 18802.6018 |



## Peak Flow Hydrologic Analysis

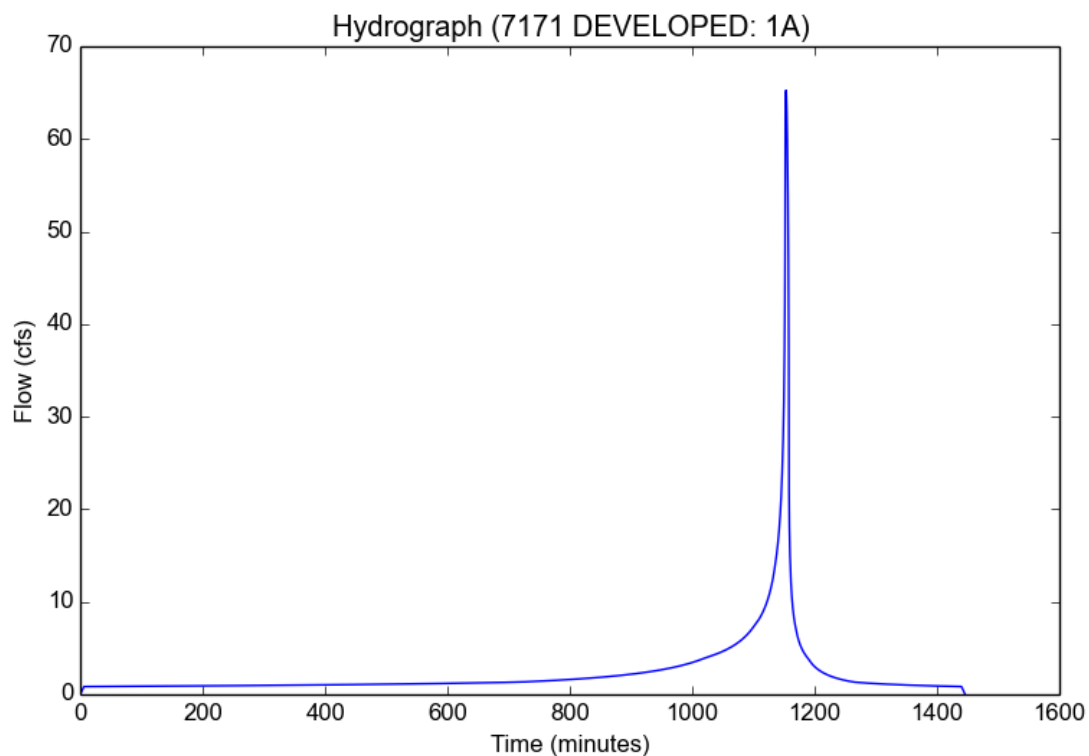
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Version: HydroCalc 0.3.1

### Input Parameters

|                           |                |
|---------------------------|----------------|
| Project Name              | 7171 DEVELOPED |
| Subarea ID                | 1A             |
| Area (ac)                 | 17.39          |
| Flow Path Length (ft)     | 1334.86        |
| Flow Path Slope (vft/hft) | 0.24           |
| 50-yr Rainfall Depth (in) | 7.3            |
| Percent Impervious        | 0.21           |
| Soil Type                 | 42             |
| Design Storm Frequency    | 100-yr         |
| Fire Factor               | 0              |
| LID                       | False          |

### Output Results

|                                      |             |
|--------------------------------------|-------------|
| Modeled (100-yr) Rainfall Depth (in) | 8.1906      |
| Peak Intensity (in/hr)               | 4.4854      |
| Undeveloped Runoff Coefficient (Cu)  | 0.8195      |
| Developed Runoff Coefficient (Cd)    | 0.8364      |
| Time of Concentration (min)          | 6.0         |
| Clear Peak Flow Rate (cfs)           | 65.2435     |
| Burned Peak Flow Rate (cfs)          | 65.2435     |
| 24-Hr Clear Runoff Volume (ac-ft)    | 4.7209      |
| 24-Hr Clear Runoff Volume (cu-ft)    | 205640.9131 |



## Peak Flow Hydrologic Analysis

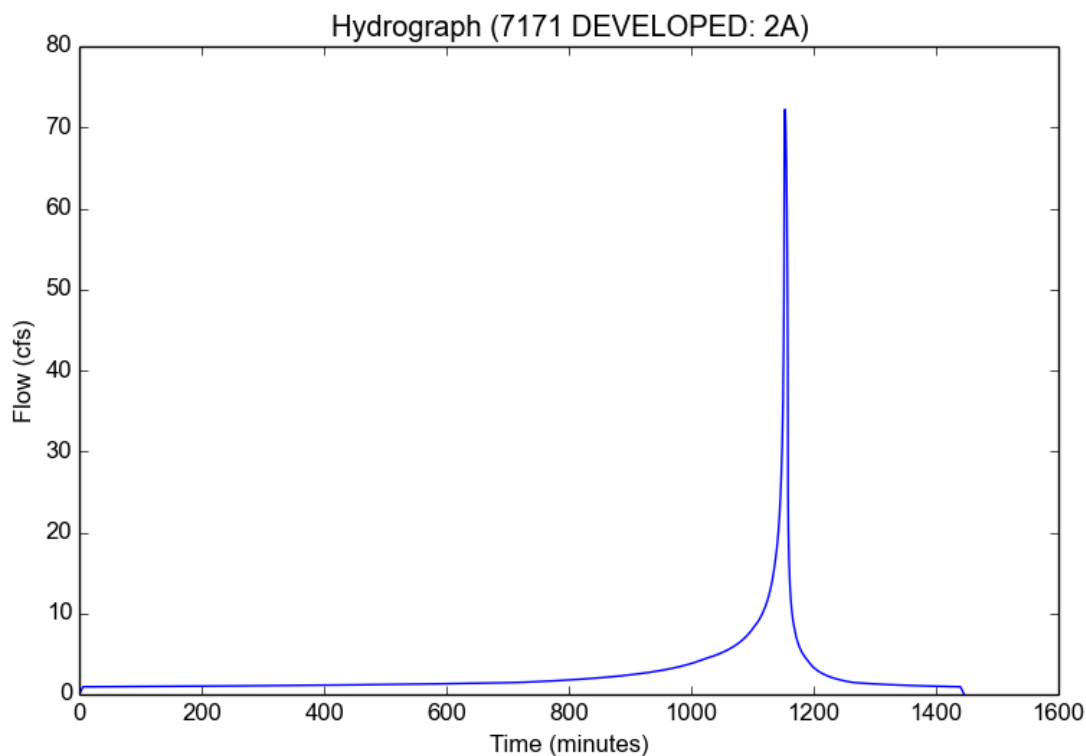
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Version: HydroCalc 0.3.1

### Input Parameters

|                           |                |
|---------------------------|----------------|
| Project Name              | 7171 DEVELOPED |
| Subarea ID                | 2A             |
| Area (ac)                 | 19.25          |
| Flow Path Length (ft)     | 1358.27        |
| Flow Path Slope (vft/hft) | 0.22           |
| 50-yr Rainfall Depth (in) | 7.3            |
| Percent Impervious        | 0.21           |
| Soil Type                 | 42             |
| Design Storm Frequency    | 100-yr         |
| Fire Factor               | 0              |
| LID                       | False          |

### Output Results

|                                      |             |
|--------------------------------------|-------------|
| Modeled (100-yr) Rainfall Depth (in) | 8.1906      |
| Peak Intensity (in/hr)               | 4.4854      |
| Undeveloped Runoff Coefficient (Cu)  | 0.8195      |
| Developed Runoff Coefficient (Cd)    | 0.8364      |
| Time of Concentration (min)          | 6.0         |
| Clear Peak Flow Rate (cfs)           | 72.2219     |
| Burned Peak Flow Rate (cfs)          | 72.2219     |
| 24-Hr Clear Runoff Volume (ac-ft)    | 5.2258      |
| 24-Hr Clear Runoff Volume (cu-ft)    | 227635.8584 |



## Peak Flow Hydrologic Analysis

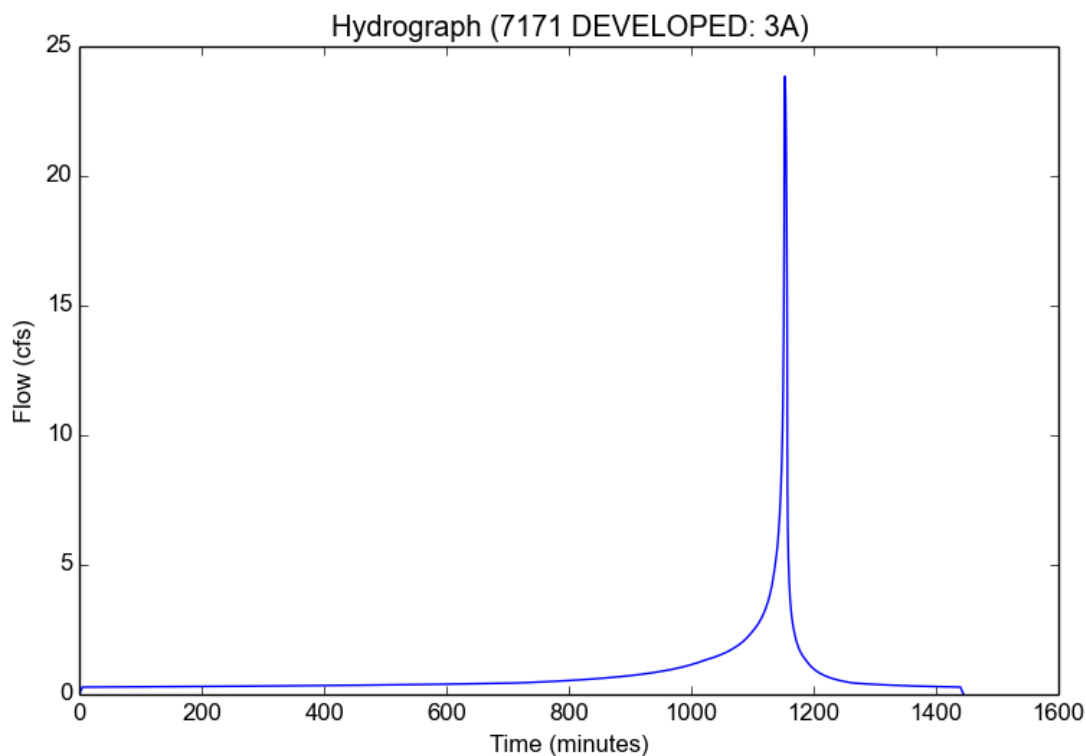
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Version: HydroCalc 0.3.1

### Input Parameters

|                           |                |
|---------------------------|----------------|
| Project Name              | 7171 DEVELOPED |
| Subarea ID                | 3A             |
| Area (ac)                 | 5.77           |
| Flow Path Length (ft)     | 772.8          |
| Flow Path Slope (vft/hft) | 0.34           |
| 50-yr Rainfall Depth (in) | 7.3            |
| Percent Impervious        | 0.21           |
| Soil Type                 | 42             |
| Design Storm Frequency    | 100-yr         |
| Fire Factor               | 0              |
| LID                       | False          |

### Output Results

|                                      |            |
|--------------------------------------|------------|
| Modeled (100-yr) Rainfall Depth (in) | 8.1906     |
| Peak Intensity (in/hr)               | 4.8867     |
| Undeveloped Runoff Coefficient (Cu)  | 0.8314     |
| Developed Runoff Coefficient (Cd)    | 0.8458     |
| Time of Concentration (min)          | 5.0        |
| Clear Peak Flow Rate (cfs)           | 23.8489    |
| Burned Peak Flow Rate (cfs)          | 23.8489    |
| 24-Hr Clear Runoff Volume (ac-ft)    | 1.5668     |
| 24-Hr Clear Runoff Volume (cu-ft)    | 68249.8947 |





## Peak Flow Hydrologic Analysis

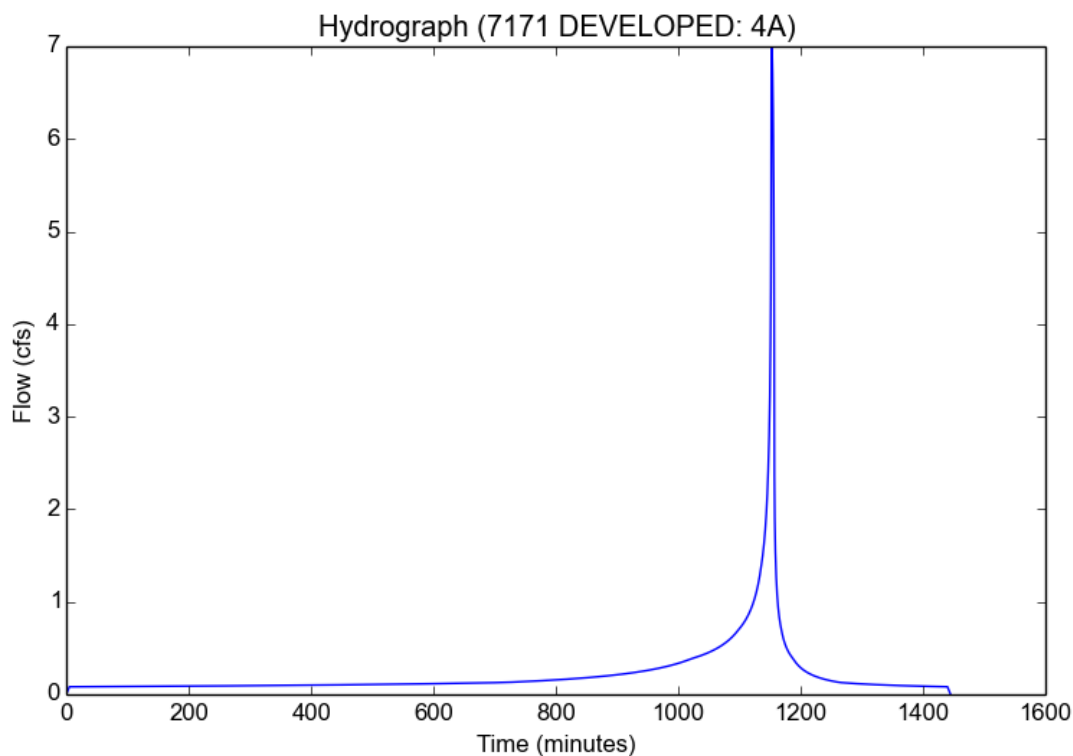
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Version: HydroCalc 0.3.1

### Input Parameters

|                           |                |
|---------------------------|----------------|
| Project Name              | 7171 DEVELOPED |
| Subarea ID                | 4A             |
| Area (ac)                 | 1.69           |
| Flow Path Length (ft)     | 627.33         |
| Flow Path Slope (vft/hft) | 0.19           |
| 50-yr Rainfall Depth (in) | 7.3            |
| Percent Impervious        | 0.21           |
| Soil Type                 | 42             |
| Design Storm Frequency    | 100-yr         |
| Fire Factor               | 0              |
| LID                       | False          |

### Output Results

|                                      |            |
|--------------------------------------|------------|
| Modeled (100-yr) Rainfall Depth (in) | 8.1906     |
| Peak Intensity (in/hr)               | 4.8867     |
| Undeveloped Runoff Coefficient (Cu)  | 0.8314     |
| Developed Runoff Coefficient (Cd)    | 0.8458     |
| Time of Concentration (min)          | 5.0        |
| Clear Peak Flow Rate (cfs)           | 6.9852     |
| Burned Peak Flow Rate (cfs)          | 6.9852     |
| 24-Hr Clear Runoff Volume (ac-ft)    | 0.4589     |
| 24-Hr Clear Runoff Volume (cu-ft)    | 19990.0038 |



# Detention Calculations

**Detention basin volumes****9712 Oak Pass Road****Los Angeles, CA****project number 7171****4/8/2019**

box dimensions:

10 ft wide

25 ft long

| elevation | incremental<br>depth<br>(ft) | total<br>depth<br>(ft) | total<br>volume<br>(cubic ft) | total<br>volume<br>(acre-ft) |
|-----------|------------------------------|------------------------|-------------------------------|------------------------------|
|           |                              |                        |                               |                              |
| 0         |                              | 0                      | 0                             | 0                            |
|           | 1                            |                        |                               |                              |
| 1         |                              | 1                      | 250                           | 0.006                        |
|           | 1                            |                        |                               |                              |
| 2         |                              | 2                      | 500                           | 0.011                        |
|           | 1                            |                        |                               |                              |
| 3         |                              | 3                      | 750                           | 0.017                        |
|           | 1                            |                        |                               |                              |
| 4         |                              | 4                      | 1000                          | 0.023                        |
|           | 1                            |                        |                               |                              |
| 5         |                              | 5                      | 1250                          | 0.029                        |
|           | 1                            |                        |                               |                              |
| 6         |                              | 6                      | 1500                          | 0.034                        |
|           | 1                            |                        |                               |                              |
| 7         |                              | 7                      | 1750                          | 0.040                        |
|           | 1                            |                        |                               |                              |
| 8         |                              | 8                      | 2000                          | 0.046                        |

NOTE - One detention system will be located within drainage area 1A and another within drainage area 2A. Combined they will provide enough detention to reduce post-developed runoff to be less than or equal to pre-developed runoff from the entire site.

# Stage-Discharge curves for Detention Basin

9712 Oak Pass Road

Los Angeles, CA

project number 7171

12/5/2017

Orifice equation:

$$Q = C \cdot A \cdot (2 \cdot 32.2 \cdot h)^{0.5}$$

Weir equation for sharp crested weir:

$$Q = K(2 \cdot g)^{0.5} \cdot L \cdot H^{1.5}$$

## outlet pipe at bottom

Number of orifices

1

C value for orifice

0.6

height of orifice above bottom

0

diameter of orifice (in)

10

centerline elev.of orifice

0.42

| Elevation | Depth | Outflow | Storage |      |
|-----------|-------|---------|---------|------|
|           | (ft)  | (cfs)   | (ac-ft) |      |
| 0         | 0     | 0.00    | 0.000   | 0.00 |
| 1         | 1     | 2.01    | 0.006   | 2.01 |
| 2         | 2     | 3.30    | 0.011   | 3.30 |
| 3         | 3     | 4.22    | 0.017   | 4.22 |
| 4         | 4     | 4.97    | 0.023   | 4.97 |
| 5         | 5     | 5.62    | 0.029   | 5.62 |
| 6         | 6     | 6.21    | 0.034   | 6.21 |
| 7         | 7     | 6.74    | 0.040   | 6.74 |
| 8         | 8     | 7.23    | 0.046   | 7.23 |

Program Package Serial Number: 2174

4/7/2019 FILE: 7171dv INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1  
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\Documents and  
Settings\XPMUser\Desktop\LAR04\la

9712 Oak Pass Road (developed, 50-YR FREQ)

|          |    | SUBAREA  | SUBAREA | TOTAL    | TOTAL  | CONV | CONV     | CONV   | CONV     | CONV | CONTROL | SOIL |    |      | STORM DAY 4 |
|----------|----|----------|---------|----------|--------|------|----------|--------|----------|------|---------|------|----|------|-------------|
| LOCATION |    | AREA(Ac) | Q(CFS)  | AREA(Ac) | Q(CFS) | TYPE | LNTH(Ft) | SLOPE  | SIZE(Ft) | Z    | Q(CFS)  | NAME | TC | ZONE | IMPV        |
| 7171     | 1A | 5.0      | 6.76    | 5.0      | 6.76   | 0    | 0.       | .00000 | .00      | .00  | 0.      | 21   | 15 | A38  | .05         |
| 7171     | 2A | .0       | .00     | 5.0      | 6.76   | 0    | 0.       | .00000 | .00      | .00  | 0.      | 21   | 99 | A38  | .00         |

Study Date : 4/7/19 Input hydrograph file name : 7171dv.hyd  
Output hydrograph file name: 7171dv50.hin

User entry of depth-outflow-storage data

Hydrograph time unit varies

Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)

Initial basin storage = 0.00 (Ac.Ft)

Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data @ 1 Min. Intervals:

| Basin Depth<br>(Ft.) | Storage<br>(Ac.Ft) | Outflow<br>(CFS) | (S-0*dt/2)<br>(Ac.Ft) | (S+0*dt/2)<br>(Ac.Ft) |
|----------------------|--------------------|------------------|-----------------------|-----------------------|
|----------------------|--------------------|------------------|-----------------------|-----------------------|

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1.000 | 0.006 | 2.010 | 0.005 | 0.007 |
| 2.000 | 0.011 | 3.300 | 0.009 | 0.013 |
| 3.000 | 0.017 | 4.220 | 0.014 | 0.020 |
| 4.000 | 0.023 | 4.970 | 0.020 | 0.026 |
| 5.000 | 0.029 | 5.620 | 0.025 | 0.033 |
| 6.000 | 0.034 | 6.210 | 0.030 | 0.038 |
| 7.000 | 0.040 | 6.740 | 0.035 | 0.045 |
| 8.000 | 0.046 | 7.230 | 0.041 | 0.051 |

Hydrograph Detention Basin Routing

Hydrograph at 7171 2 A Storm Day: 4 Drainage Area = 5.00

Total flood hydrograph volume this storm day = 0.20 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

| Time<br>(Min) | Inflow<br>(CFS) | Outflow<br>(CFS) | Storage<br>(Ac.Ft) | 0  | 1.8 | 3.5 | 5.3 | 7.0 | Depth<br>(Ft.) |
|---------------|-----------------|------------------|--------------------|----|-----|-----|-----|-----|----------------|
| 0             | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 100           | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 200           | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 300           | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 400           | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 500           | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 600           | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 700           | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 800           | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 900           | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 1000          | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 1050          | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 1100          | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 1110          | 0.0             | 0.0              | 0.000              | 0  |     |     |     |     | 0.0            |
| 1120          | 1.0             | 0.8              | 0.002              | 0I |     |     |     |     | 0.4            |
| 1130          | 1.0             | 1.0              | 0.003              | 0  |     |     |     |     | 0.5            |
| 1131          | 1.0             | 1.0              | 0.003              | 0  |     |     |     |     | 0.5            |
| 1132          | 1.0             | 1.0              | 0.003              | 0  |     |     |     |     | 0.5            |
| 1133          | 1.0             | 1.0              | 0.003              | 0  |     |     |     |     | 0.5            |
| 1134          | 1.0             | 1.0              | 0.003              | 0  |     |     |     |     | 0.5            |
| 1135          | 1.0             | 1.0              | 0.003              | 0  |     |     |     |     | 0.5            |

|      |     |     |       |   |    |   |   |   |    |     |
|------|-----|-----|-------|---|----|---|---|---|----|-----|
| 1136 | 1.0 | 1.0 | 0.003 | 0 |    |   |   |   |    | 0.5 |
| 1137 | 1.0 | 1.0 | 0.003 | 0 |    |   |   |   |    | 0.5 |
| 1138 | 1.0 | 1.0 | 0.003 | 0 |    |   |   |   |    | 0.5 |
| 1139 | 1.0 | 1.0 | 0.003 | 0 |    |   |   |   |    | 0.5 |
| 1140 | 1.0 | 1.0 | 0.003 | 0 |    |   |   |   |    | 0.5 |
| 1141 | 2.0 | 1.4 | 0.004 | 0 | I  |   |   |   |    | 0.7 |
| 1142 | 2.0 | 1.6 | 0.005 | 0 | I  |   |   |   |    | 0.8 |
| 1143 | 2.0 | 1.8 | 0.005 |   | OI |   |   |   |    | 0.9 |
| 1144 | 2.0 | 1.8 | 0.006 |   | OI |   |   |   |    | 0.9 |
| 1145 | 2.0 | 1.9 | 0.006 |   | OI |   |   |   |    | 0.9 |
| 1146 | 2.0 | 1.9 | 0.006 |   | OI |   |   |   |    | 1.0 |
| 1147 | 2.0 | 2.0 | 0.006 |   | OI |   |   |   |    | 1.0 |
| 1148 | 3.0 | 2.3 | 0.007 |   | 0  | I |   |   |    | 1.2 |
| 1149 | 3.0 | 2.5 | 0.008 |   | 0  | I |   |   |    | 1.4 |
| 1150 | 4.0 | 3.0 | 0.010 |   |    | 0 | I |   |    | 1.7 |
| 1151 | 5.0 | 3.5 | 0.012 |   |    | 0 |   | I |    | 2.2 |
| 1152 | 6.0 | 4.0 | 0.015 |   |    |   | 0 |   | I  | 2.7 |
| 1153 | 7.0 | 4.5 | 0.019 |   |    |   | 0 |   |    | 3.3 |
| 1154 | 7.0 | 4.9 | 0.022 |   |    |   |   | 0 |    | 3.9 |
| 1155 | 7.0 | 5.2 | 0.025 |   |    |   |   | 0 |    | 4.3 |
| 1156 | 7.0 | 5.4 | 0.027 |   |    |   |   | 0 |    | 4.7 |
| 1157 | 7.0 | 5.7 | 0.029 |   |    |   |   | 0 |    | 5.1 |
| 1158 | 6.0 | 5.7 | 0.030 |   |    |   |   |   | OI | 5.2 |
| 1159 | 6.0 | 5.8 | 0.030 |   |    |   |   |   | OI | 5.2 |
| 1160 | 6.0 | 5.8 | 0.030 |   |    |   |   |   | OI | 5.3 |
| 1161 | 6.0 | 5.8 | 0.031 |   |    |   |   |   | OI | 5.3 |
| 1162 | 5.0 | 5.7 | 0.030 |   |    |   |   | I | 0  | 5.1 |
| 1163 | 5.0 | 5.6 | 0.029 |   |    |   |   | I | 0  | 5.0 |
| 1164 | 4.0 | 5.4 | 0.027 |   |    |   | I |   | 0  | 4.6 |
| 1165 | 3.0 | 5.0 | 0.024 |   |    | I |   |   | 0  | 4.1 |
| 1166 | 2.0 | 4.6 | 0.020 |   | I  |   |   | 0 |    | 3.5 |
| 1167 | 2.0 | 4.2 | 0.017 |   | I  |   | 0 |   |    | 2.9 |
| 1168 | 1.0 | 3.6 | 0.013 | I |    |   | 0 |   |    | 2.3 |
| 1169 | 1.0 | 2.9 | 0.010 | I |    | 0 |   |   |    | 1.7 |
| 1170 | 1.0 | 2.3 | 0.007 | I |    | 0 |   |   |    | 1.3 |
| 1171 | 1.0 | 1.9 | 0.006 | I | 0  |   |   |   |    | 1.0 |
| 1172 | 1.0 | 1.6 | 0.005 | I | 0  |   |   |   |    | 0.8 |
| 1173 | 1.0 | 1.4 | 0.004 | I | 0  |   |   |   |    | 0.7 |
| 1174 | 0.0 | 0.9 | 0.003 | I | 0  |   |   |   |    | 0.4 |
| 1175 | 0.0 | 0.5 | 0.002 | I | 0  |   |   |   |    | 0.3 |
| 1176 | 0.0 | 0.3 | 0.001 | I | 0  |   |   |   |    | 0.2 |
| 1177 | 0.0 | 0.2 | 0.001 | 0 |    |   |   |   |    | 0.1 |
| 1178 | 0.0 | 0.1 | 0.000 | 0 |    |   |   |   |    | 0.1 |
| 1179 | 0.0 | 0.1 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1180 | 0.0 | 0.1 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1181 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1182 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1183 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1184 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1185 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1186 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1187 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1188 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1189 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1190 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1191 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1192 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1193 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1194 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1195 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1196 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1197 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |
| 1198 | 0.0 | 0.0 | 0.000 | 0 |    |   |   |   |    | 0.0 |

|      |     |     |       |   |  |  |  |  |     |
|------|-----|-----|-------|---|--|--|--|--|-----|
| 1199 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1200 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1201 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1202 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1203 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1204 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1205 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1206 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1207 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1208 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1209 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1210 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1211 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1212 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1213 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1214 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1215 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1216 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1217 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1218 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1219 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1220 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1221 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1222 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1223 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1224 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1225 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1226 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1227 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1228 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1229 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1230 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1231 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1232 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1233 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1234 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1235 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1236 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1237 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1238 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1239 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1240 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1241 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1242 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1243 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1244 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1245 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1246 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1247 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1248 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1249 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1250 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1251 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1252 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1253 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1254 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1255 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1256 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1257 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1258 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1259 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1260 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1261 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |



|      |     |     |       |   |  |  |  |  |     |
|------|-----|-----|-------|---|--|--|--|--|-----|
| 1262 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1263 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1264 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1265 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1266 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1267 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1268 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1269 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1270 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1271 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1272 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1273 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1274 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1275 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1276 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1277 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1278 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1279 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1280 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1281 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1282 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1283 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1284 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1285 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1286 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1287 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1288 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1289 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1290 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1291 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1292 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1293 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1294 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1295 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1296 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1297 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1298 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1299 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1300 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1310 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1320 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1330 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1340 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1350 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1360 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1370 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1380 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1390 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1400 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1420 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1440 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1460 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1500 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |

Remaining water in basin = 0.00 (Ac.Ft)  
 Peak flow out of basin = 5.82(CFS)  
 Peak flow time = 1161 Min., time interval # = 47  
 Maximum depth in basin = 5.34(Ft.)

Program Package Serial Number: 2174

4/7/2019 FILE: 7171dv INPUT DATA: English Units RAINFALL SOIL FILE: English (In) OUTPUT DATA: English Units PAGE 1  
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT PROG F0601M

Version 11, MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR =100 SOIL DATA FILE: C:\Documents and  
Settings\XPMUser\Desktop\LAR04\la

9712 Oak Pass Drive (developed, 100-YR FREQ)

|          |    |          |         |          |        |      |          |        |          |      |         |      | STORM DAY 4 |      |
|----------|----|----------|---------|----------|--------|------|----------|--------|----------|------|---------|------|-------------|------|
|          |    | SUBAREA  | SUBAREA | TOTAL    | TOTAL  | CONV | CONV     | CONV   | CONV     | CONV | CONTROL | SOIL | RAIN        | PCT  |
| LOCATION |    | AREA(Ac) | Q(CFS)  | AREA(Ac) | Q(CFS) | TYPE | LNTH(Ft) | SLOPE  | SIZE(Ft) | Z    | Q(CFS)  | NAME | TC          | ZONE |
| 7171     | 1A | 5.0      | 8.90    | 5.0      | 8.90   | 0    | 0.       | .00000 | .00      | .00  | 0.      | 21   | 13          | A38  |
| 7171     | 2A | .0       | .00     | 5.0      | 8.90   | 0    | 0.       | .00000 | .00      | .00  | 0.      | 21   | 99          | A38  |

Study Date : 4/7/19 Input hydrograph file name : 7171dv.hyd  
 Output hydrograph file name: 7171dv100.hin

User entry of depth-outflow-storage data

Hydrograph time unit varies

Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)

Initial basin storage = 0.00 (Ac.Ft)

Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data @ 1 Min. Intervals:

| Basin Depth<br>(Ft.) | Storage<br>(Ac.Ft) | Outflow<br>(CFS) | (S-0*dt/2)<br>(Ac.Ft) | (S+0*dt/2)<br>(Ac.Ft) |
|----------------------|--------------------|------------------|-----------------------|-----------------------|
|----------------------|--------------------|------------------|-----------------------|-----------------------|

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1.000 | 0.006 | 2.010 | 0.005 | 0.007 |
| 2.000 | 0.011 | 3.300 | 0.009 | 0.013 |
| 3.000 | 0.017 | 4.220 | 0.014 | 0.020 |
| 4.000 | 0.023 | 4.970 | 0.020 | 0.026 |
| 5.000 | 0.029 | 5.620 | 0.025 | 0.033 |
| 6.000 | 0.034 | 6.210 | 0.030 | 0.038 |
| 7.000 | 0.040 | 6.740 | 0.035 | 0.045 |
| 8.000 | 0.046 | 7.230 | 0.041 | 0.051 |

Hydrograph Detention Basin Routing

Hydrograph at 7171 2 A Storm Day: 4 Drainage Area = 5.00

Total flood hydrograph volume this storm day = 0.26 Ac. Ft.

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

| Time<br>(Min) | Inflow<br>(CFS) | Outflow<br>(CFS) | Storage<br>(Ac.Ft) | 0   | 2.3 | 4.5 | 6.8 | 9.0 | Depth<br>(Ft.) |
|---------------|-----------------|------------------|--------------------|-----|-----|-----|-----|-----|----------------|
| 0             | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 100           | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 200           | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 300           | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 400           | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 500           | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 600           | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 700           | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 800           | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 900           | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 1000          | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 1050          | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 1100          | 0.0             | 0.0              | 0.000              | 0   |     |     |     |     | 0.0            |
| 1110          | 1.0             | 0.8              | 0.002              | 0I  |     |     |     |     | 0.4            |
| 1120          | 1.0             | 1.0              | 0.003              | 0   |     |     |     |     | 0.5            |
| 1130          | 1.0             | 1.0              | 0.003              | 0   |     |     |     |     | 0.5            |
| 1131          | 1.0             | 1.0              | 0.003              | 0   |     |     |     |     | 0.5            |
| 1132          | 1.0             | 1.0              | 0.003              | 0   |     |     |     |     | 0.5            |
| 1133          | 1.0             | 1.0              | 0.003              | 0   |     |     |     |     | 0.5            |
| 1134          | 1.0             | 1.0              | 0.003              | 0   |     |     |     |     | 0.5            |
| 1135          | 2.0             | 1.4              | 0.004              | 0 I |     |     |     |     | 0.7            |

|      |     |     |       |     |   |   |   |   |   |     |
|------|-----|-----|-------|-----|---|---|---|---|---|-----|
| 1136 | 2.0 | 1.6 | 0.005 | 0 I |   |   |   |   |   | 0.8 |
| 1137 | 2.0 | 1.8 | 0.005 | 0I  |   |   |   |   |   | 0.9 |
| 1138 | 2.0 | 1.8 | 0.006 | 0I  |   |   |   |   |   | 0.9 |
| 1139 | 2.0 | 1.9 | 0.006 | 0I  |   |   |   |   |   | 0.9 |
| 1140 | 2.0 | 1.9 | 0.006 | 0I  |   |   |   |   |   | 1.0 |
| 1141 | 2.0 | 2.0 | 0.006 | 0I  |   |   |   |   |   | 1.0 |
| 1142 | 2.0 | 2.0 | 0.006 | 0   |   |   |   |   |   | 1.0 |
| 1143 | 2.0 | 2.0 | 0.006 | 0   |   |   |   |   |   | 1.0 |
| 1144 | 2.0 | 2.0 | 0.006 | 0   |   |   |   |   |   | 1.0 |
| 1145 | 3.0 | 2.3 | 0.007 | 0 I |   |   |   |   |   | 1.2 |
| 1146 | 3.0 | 2.5 | 0.008 | 0 I |   |   |   |   |   | 1.4 |
| 1147 | 3.0 | 2.7 | 0.009 | 0I  |   |   |   |   |   | 1.5 |
| 1148 | 3.0 | 2.8 | 0.009 | 0I  |   |   |   |   |   | 1.6 |
| 1149 | 4.0 | 3.1 | 0.010 | 0 I |   |   |   |   |   | 1.9 |
| 1150 | 5.0 | 3.6 | 0.013 | 0   | I |   |   |   |   | 2.3 |
| 1151 | 7.0 | 4.2 | 0.017 | 0   |   | I |   |   |   | 3.0 |
| 1152 | 8.0 | 4.8 | 0.022 |     | 0 |   | I |   |   | 3.8 |
| 1153 | 9.0 | 5.4 | 0.027 |     | 0 |   |   | I |   | 4.7 |
| 1154 | 9.0 | 5.9 | 0.032 |     | 0 |   |   |   | I | 5.5 |
| 1155 | 9.0 | 6.4 | 0.036 |     | 0 |   |   |   | I | 6.3 |
| 1156 | 9.0 | 6.7 | 0.039 |     | 0 |   |   |   | I | 6.8 |
| 1157 | 9.0 | 6.9 | 0.042 |     | 0 |   |   |   | I | 7.4 |
| 1158 | 8.0 | 7.0 | 0.044 |     | 0 |   | I |   |   | 7.6 |
| 1159 | 8.0 | 7.1 | 0.045 |     | 0 |   | I |   |   | 7.8 |
| 1160 | 8.0 | 7.2 | 0.046 |     | 0 |   | I |   |   | 8.0 |
| 1161 | 7.0 | 7.2 | 0.046 |     | 0 |   |   |   |   | 7.9 |
| 1162 | 6.0 | 7.1 | 0.044 |     | I |   |   |   |   | 7.7 |
| 1163 | 5.0 | 6.9 | 0.041 |     | I |   |   |   |   | 7.2 |
| 1164 | 4.0 | 6.5 | 0.038 |     | I |   |   |   |   | 6.6 |
| 1165 | 2.0 | 6.0 | 0.032 | I   |   | 0 |   |   |   | 5.6 |
| 1166 | 2.0 | 5.4 | 0.027 | I   |   | 0 |   |   |   | 4.6 |
| 1167 | 1.0 | 4.7 | 0.021 | I   | 0 |   |   |   |   | 3.7 |
| 1168 | 1.0 | 4.1 | 0.016 | I   | 0 |   |   |   |   | 2.9 |
| 1169 | 1.0 | 3.5 | 0.013 | I   | 0 |   |   |   |   | 2.3 |
| 1170 | 1.0 | 2.9 | 0.009 | I   | 0 |   |   |   |   | 1.7 |
| 1171 | 1.0 | 2.3 | 0.007 | I   | 0 |   |   |   |   | 1.2 |
| 1172 | 1.0 | 1.9 | 0.006 | I   | 0 |   |   |   |   | 1.0 |
| 1173 | 1.0 | 1.6 | 0.005 | I 0 |   |   |   |   |   | 0.8 |
| 1174 | 1.0 | 1.4 | 0.004 | IO  |   |   |   |   |   | 0.7 |
| 1175 | 1.0 | 1.2 | 0.004 | IO  |   |   |   |   |   | 0.6 |
| 1176 | 1.0 | 1.1 | 0.003 | IO  |   |   |   |   |   | 0.6 |
| 1177 | 0.0 | 0.7 | 0.002 | I 0 |   |   |   |   |   | 0.4 |
| 1178 | 0.0 | 0.4 | 0.001 | IO  |   |   |   |   |   | 0.2 |
| 1179 | 0.0 | 0.3 | 0.001 | 0   |   |   |   |   |   | 0.1 |
| 1180 | 0.0 | 0.2 | 0.001 | 0   |   |   |   |   |   | 0.1 |
| 1181 | 0.0 | 0.1 | 0.000 | 0   |   |   |   |   |   | 0.1 |
| 1182 | 0.0 | 0.1 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1183 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1184 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1185 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1186 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1187 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1188 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1189 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1190 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1191 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1192 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1193 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1194 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1195 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1196 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1197 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |
| 1198 | 0.0 | 0.0 | 0.000 | 0   |   |   |   |   |   | 0.0 |

|      |     |     |       |   |  |  |  |  |     |
|------|-----|-----|-------|---|--|--|--|--|-----|
| 1199 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1200 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1201 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1202 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1203 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1204 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1205 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1206 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1207 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1208 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1209 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1210 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1211 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1212 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1213 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1214 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1215 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1216 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1217 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1218 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1219 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1220 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1221 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1222 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1223 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1224 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1225 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1226 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1227 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1228 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1229 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1230 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1231 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1232 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1233 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1234 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1235 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1236 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1237 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1238 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1239 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1240 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1241 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1242 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1243 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1244 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1245 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1246 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1247 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1248 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1249 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1250 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1251 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1252 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1253 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1254 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1255 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1256 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1257 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1258 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1259 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1260 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1261 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |

|      |     |     |       |   |  |  |  |  |     |
|------|-----|-----|-------|---|--|--|--|--|-----|
| 1262 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1263 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1264 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1265 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1266 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1267 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1268 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1269 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1270 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1271 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1272 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1273 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1274 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1275 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1276 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1277 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1278 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1279 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1280 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1281 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1282 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1283 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1284 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1285 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1286 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1287 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1288 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1289 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1290 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1291 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1292 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1293 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1294 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1295 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1296 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1297 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1298 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1299 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1300 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1310 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1320 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1330 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1340 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1350 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1360 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1370 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1380 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1390 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1400 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1420 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1440 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1460 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |
| 1500 | 0.0 | 0.0 | 0.000 | 0 |  |  |  |  | 0.0 |

Remaining water in basin = 0.00 (Ac.Ft)  
 Peak flow out of basin = 7.22(CFS)  
 Peak flow time = 1160 Min., time interval # = 46  
 Maximum depth in basin = 7.99(Ft.)

# Energy Dissipator Design - RIP RAP PAD

9712 Oak Pass Road  
Job Number 7171

7-Apr-19

|                                                     | subarea<br>3A(1) | subarea<br>3A(2) | subarea<br>3A(3) | subarea<br>3A(4) |        |
|-----------------------------------------------------|------------------|------------------|------------------|------------------|--------|
| Discharge, Q =                                      | 6.18             | 6.05             | 6.38             | 5.24             | cfs    |
| pipe diameter, D =                                  | 1                | 1                | 1                | 1                | ft     |
| flow area at end of pipe, Ao =                      | 0.43             | 0.41             | 0.44             | 0.37             | sq ft  |
| equivalent depth, $y_e=(A/2)*0.5 =$                 | 0.46             | 0.45             | 0.47             | 0.43             | ft     |
| depth, $y_n =$                                      | 0.53             | 0.52             | 0.54             | 0.48             | ft     |
| velocity, $V_o =$                                   | 14.55            | 14.59            | 14.68            | 13.98            | ft/sec |
| Froude number, $Fr=V_o/(g*y_e)^{1/2}=$              | 3.78             | 3.82             | 3.79             | 3.76             |        |
| tailwater depth, TW=                                | 0.53             | 0.52             | 0.54             | 0.48             | ft     |
| $D_{50}=0.2*D*(Q/(g^{0.5})(D^{2.5}))^{1.33}*(D/TW)$ | 0.42             | 0.42             | 0.43             | 0.37             | ft     |
| $D'=(D+y_n)/2$                                      | 0.77             | 0.76             | 0.77             | 0.74             | ft     |
| from table 10.1, HEC-14, Apron Length=              | 4.00             | 5.00             | 4.00             | 4.00             | ft     |
| from table 10.1, HEC-14, Apron Depth=               | 1.48             | 1.01             | 1.43             | 1.31             | ft     |
| Width of Apron= $W1=3*D$                            | 3.00             | 3.00             | 3.00             | 3.00             | ft     |
| Width of Apron= $W2=W1+2*L/3$                       | 6.33             | 6.33             | 6.33             | 6.33             | ft     |

**Table 10.1. Example Riprap Classes and Apron Dimensions**

| Class | D <sub>50</sub> (mm) | D <sub>50</sub> (in) | Apron Length <sup>1</sup> | Apron Depth        |
|-------|----------------------|----------------------|---------------------------|--------------------|
| 1     | 125                  | 5                    | 4D                        | 3.5D <sub>50</sub> |
| 2     | 150                  | 6                    | 4D                        | 3.3D <sub>50</sub> |
| 3     | 250                  | 10                   | 5D                        | 2.4D <sub>50</sub> |
| 4     | 350                  | 14                   | 6D                        | 2.2D <sub>50</sub> |
| 5     | 500                  | 20                   | 7D                        | 2.0D <sub>50</sub> |
| 6     | 550                  | 22                   | 8D                        | 2.0D <sub>50</sub> |

<sup>1</sup>D is the culvert rise.

# APPENDIX C



### 85th Percentile Volume Summary

| Subarea Name          | Area<br>(ac) | Path of<br>Travel (ft) | Slope<br>(%) | Intensity<br>(in) | % Impervious | Soil<br>Number | Volume<br>(cf) |
|-----------------------|--------------|------------------------|--------------|-------------------|--------------|----------------|----------------|
| 1A(4)                 | 0.74         | 606                    | 0.12         | 1.2               | 0.9          | 42             | 2624.2         |
| 1A(5)                 | 3.8          | 406                    | 0.33         | 1.2               | 0.45         | 42             | 7653.8         |
| 1A(6)                 | 3.09         | 573                    | 0.25         | 1.2               | 0.45         | 42             | 6195.1         |
| 1A(7),(8),(15)        | 0.69         | 382                    | 0.157        | 1.2               | 0.9          | 42             | 2448.2         |
| 1A(9),(10)            | 0.39         | 410                    | 0.158        | 1.2               | 0.9          | 42             | 1383.6         |
| 2A(6)                 | 1.97         | 352                    | 0.215        | 1.2               | 0.25         | 42             | 2605.1         |
| 2A(7)                 | 1.66         | 166                    | 0.24         | 1.2               | 0.25         | 42             | 2230.4         |
| 2A(8)                 | 1.39         | 255                    | 0.35         | 1.2               | 0.25         | 42             | 1861.1         |
| 2A(9)                 | 1.42         | 266                    | 0.45         | 1.2               | 0.25         | 42             | 1901.3         |
| 2A(10)                | 1.3          | 166                    | 0.26         | 1.2               | 0.25         | 42             | 1746.7         |
| 2A(11),(23)           | 0.47         | 272                    | 0.08         | 1.2               | 0.9          | 42             | 1667.8         |
| 2A(12),(13)           | 0.38         | 546                    | 0.05         | 1.2               | 0.9          | 42             | 1347.5         |
| 2A(14),(15),(16)      | 0.61         | 621                    | 0.075        | 1.2               | 0.9          | 42             | 2163.0         |
| 2A(17),(18),(19),(20) | 0.54         | 727                    | 0.14         | 1.2               | 0.9          | 42             | 1914.8         |
| 2A(24),(25)           | 0.38         | 461                    | 0.13         | 1.2               | 0.9          | 42             | 1348.0         |
| 2A(26)                | 1.15         | 343                    | 0.26         | 1.2               | 0.45         | 42             | 2318.8         |
| 3A(1)                 | 1.5          | 200                    | 0.45         | 1.2               | 0.25         | 42             | 2015.5         |
| 3A(2)                 | 1.46         | 230                    | 0.45         | 1.2               | 0.25         | 42             | 1958.9         |
| 3A(3)                 | 1.54         | 376                    | 0.45         | 1.2               | 0.25         | 42             | 2044.0         |
| 3A(4)                 | 1.27         | 470                    | 0.45         | 1.2               | 0.25         | 42             | 1676.5         |

## Peak Flow Hydrologic Analysis

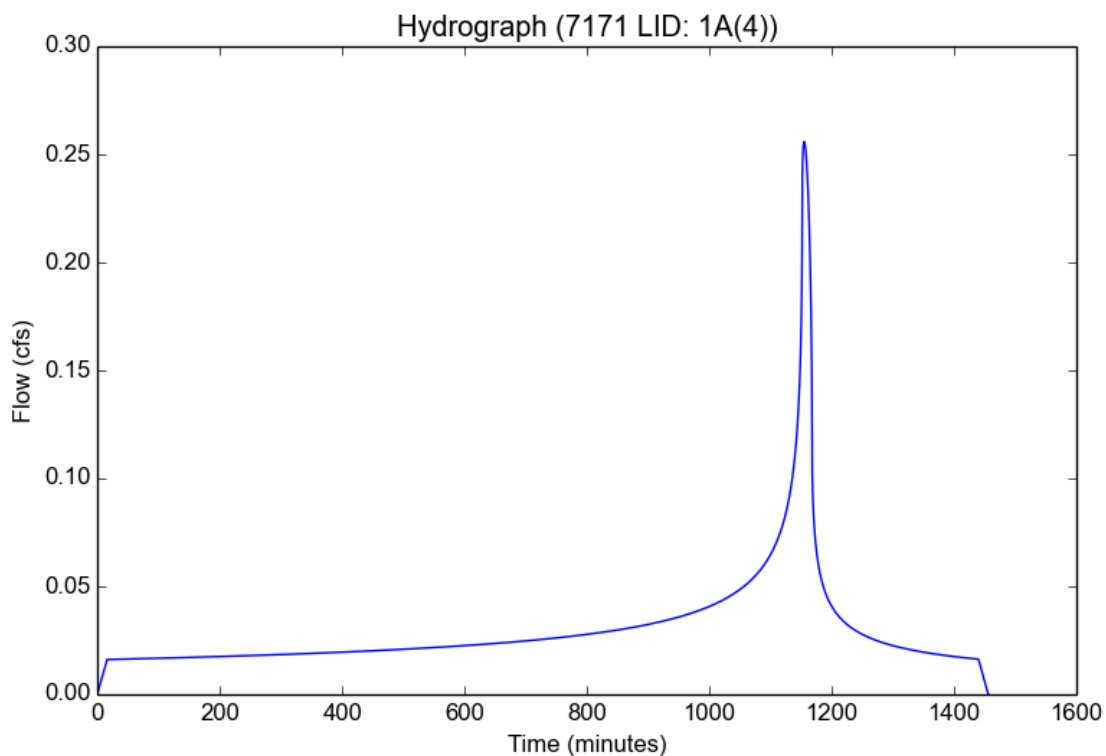
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171 LID Output R  
Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 1A(4)                 |
| Area (ac)                           | 0.74                  |
| Flow Path Length (ft)               | 606.0                 |
| Flow Path Slope (vft/hft)           | 0.12                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.9                   |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.4144    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.2447    |
| Developed Runoff Coefficient (Cd)                   | 0.8345    |
| Time of Concentration (min)                         | 16.0      |
| Clear Peak Flow Rate (cfs)                          | 0.2559    |
| Burned Peak Flow Rate (cfs)                         | 0.2559    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0602    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 2624.2229 |



## Peak Flow Hydrologic Analysis

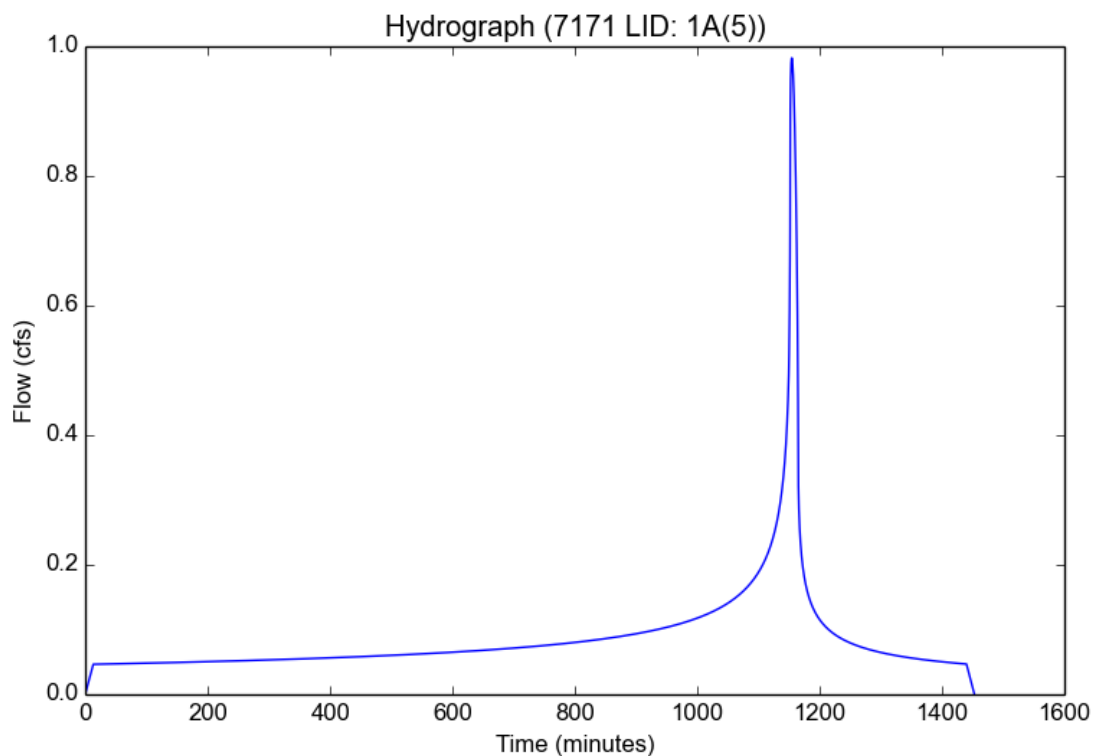
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 1A(5)                 |
| Area (ac)                           | 3.8                   |
| Flow Path Length (ft)               | 406.0                 |
| Flow Path Slope (vft/hft)           | 0.33                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.45                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.4569    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.2921    |
| Developed Runoff Coefficient (Cd)                   | 0.5657    |
| Time of Concentration (min)                         | 13.0      |
| Clear Peak Flow Rate (cfs)                          | 0.9822    |
| Burned Peak Flow Rate (cfs)                         | 0.9822    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.1757    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 7653.7973 |



## Peak Flow Hydrologic Analysis

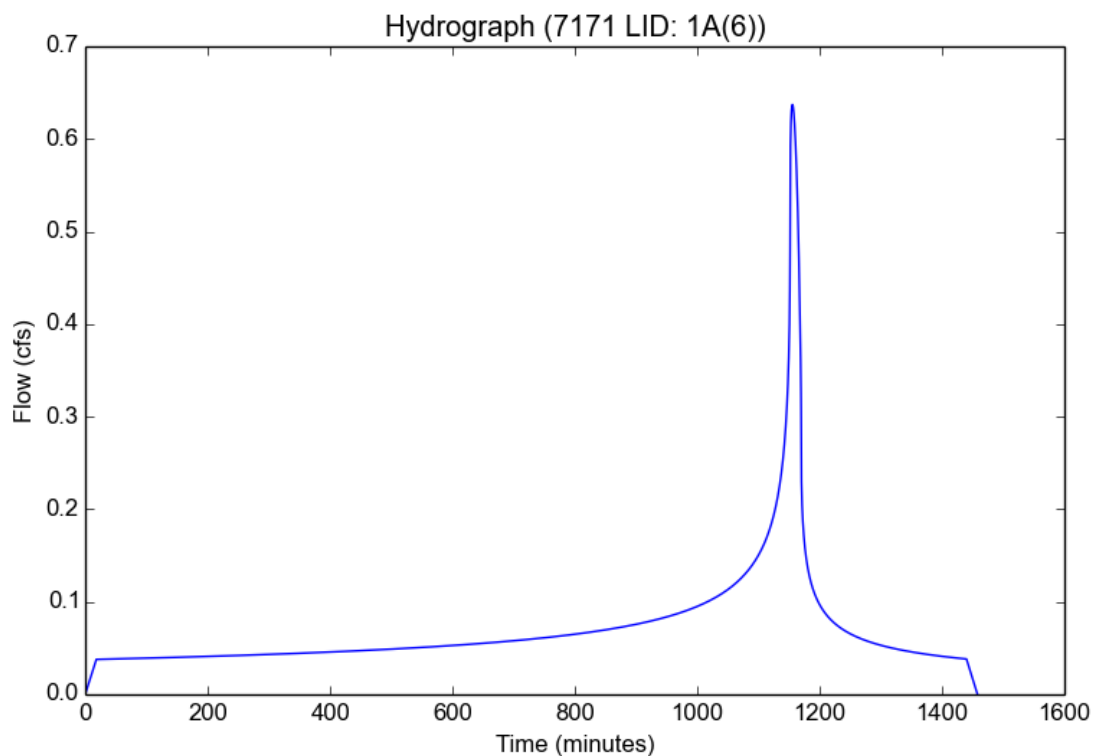
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 1A(6)                 |
| Area (ac)                           | 3.09                  |
| Flow Path Length (ft)               | 573.0                 |
| Flow Path Slope (vft/hft)           | 0.25                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.45                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.3921    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.2197    |
| Developed Runoff Coefficient (Cd)                   | 0.5258    |
| Time of Concentration (min)                         | 18.0      |
| Clear Peak Flow Rate (cfs)                          | 0.6371    |
| Burned Peak Flow Rate (cfs)                         | 0.6371    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.1422    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 6195.1098 |



## Peak Flow Hydrologic Analysis

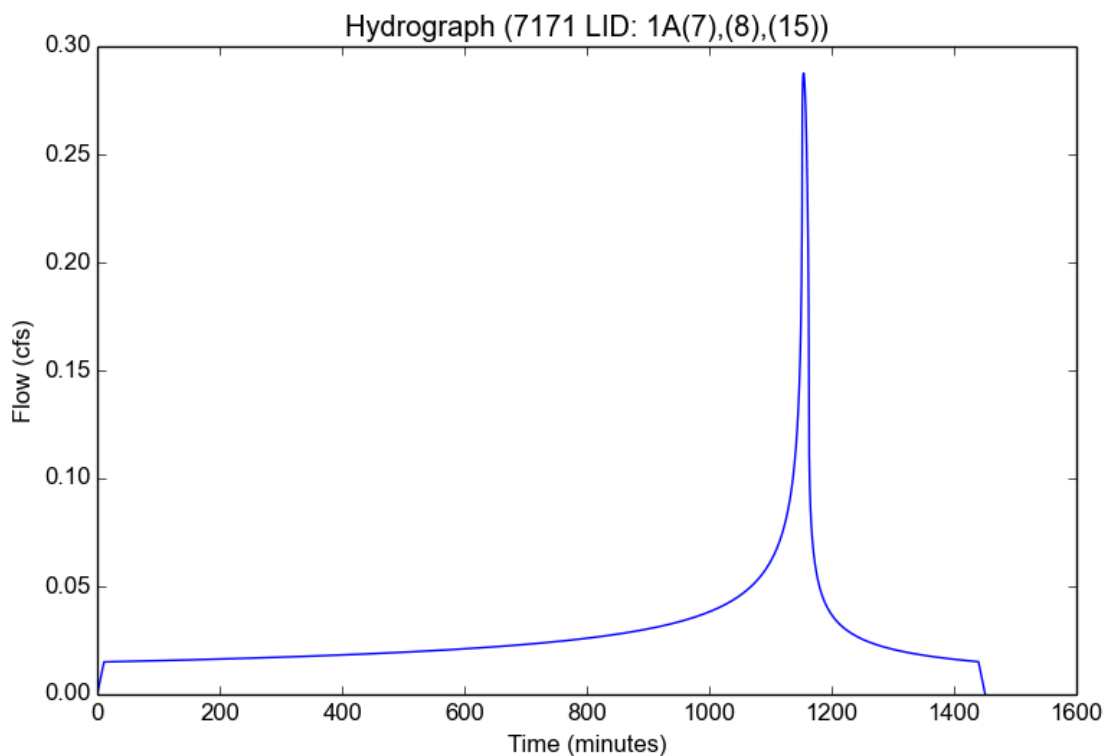
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 1A(7),(8),(15)        |
| Area (ac)                           | 0.69                  |
| Flow Path Length (ft)               | 382.0                 |
| Flow Path Slope (vft/hft)           | 0.157                 |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.9                   |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |          |
|-----------------------------------------------------|----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2      |
| Peak Intensity (in/hr)                              | 0.4942   |
| Undeveloped Runoff Coefficient (Cu)                 | 0.3339   |
| Developed Runoff Coefficient (Cd)                   | 0.8434   |
| Time of Concentration (min)                         | 11.0     |
| Clear Peak Flow Rate (cfs)                          | 0.2876   |
| Burned Peak Flow Rate (cfs)                         | 0.2876   |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0562   |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 2448.209 |



## Peak Flow Hydrologic Analysis

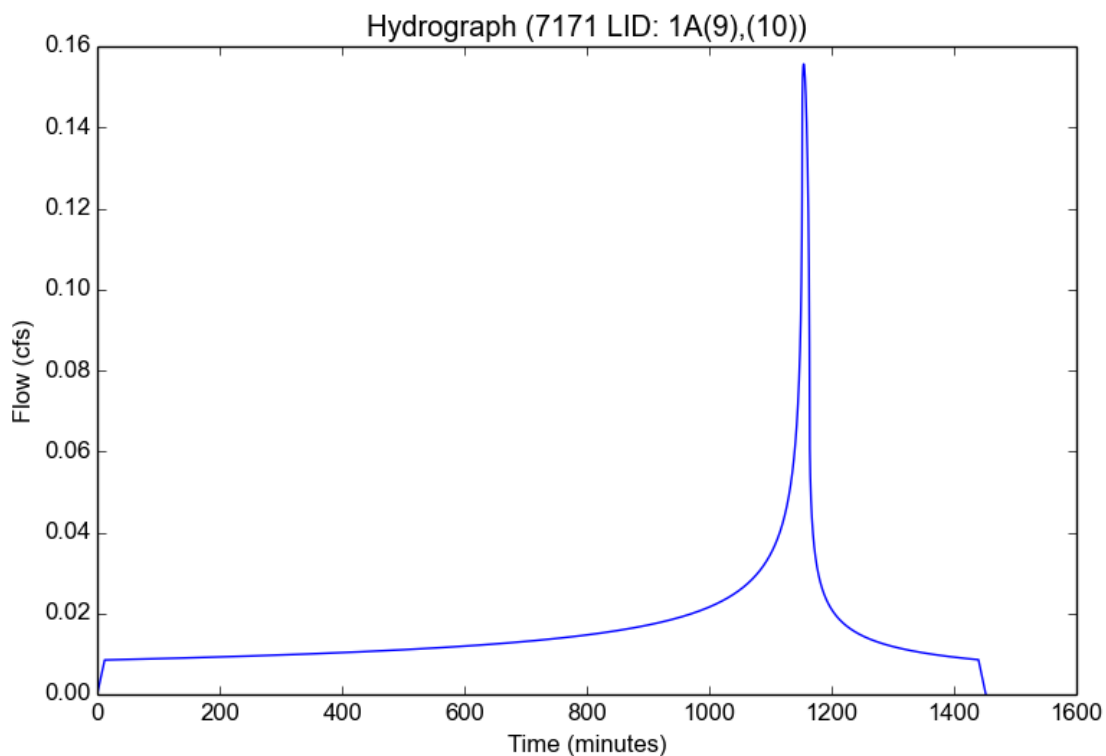
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 1A(9),(10)            |
| Area (ac)                           | 0.39                  |
| Flow Path Length (ft)               | 410.0                 |
| Flow Path Slope (vft/hft)           | 0.158                 |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.9                   |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.4744    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.3117    |
| Developed Runoff Coefficient (Cd)                   | 0.8412    |
| Time of Concentration (min)                         | 12.0      |
| Clear Peak Flow Rate (cfs)                          | 0.1556    |
| Burned Peak Flow Rate (cfs)                         | 0.1556    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0318    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 1383.6051 |



## Peak Flow Hydrologic Analysis

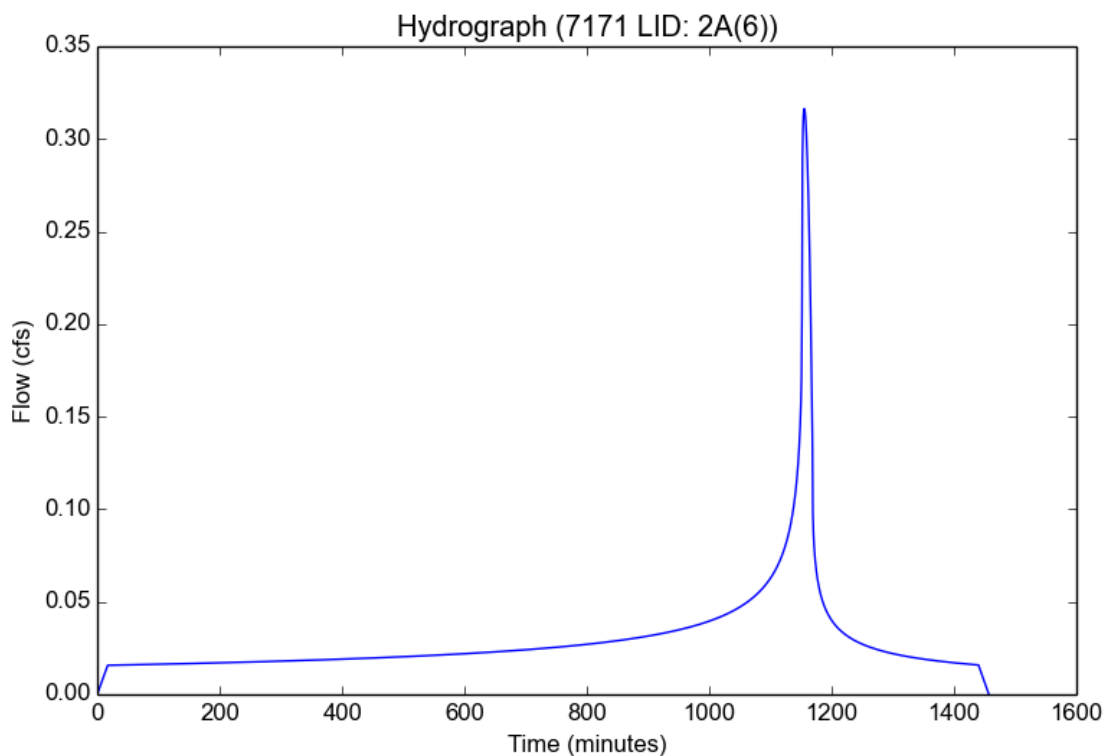
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 2A(6)                 |
| Area (ac)                           | 1.97                  |
| Flow Path Length (ft)               | 352.0                 |
| Flow Path Slope (vft/hft)           | 0.215                 |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.25                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.4028    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.2317    |
| Developed Runoff Coefficient (Cd)                   | 0.3987    |
| Time of Concentration (min)                         | 17.0      |
| Clear Peak Flow Rate (cfs)                          | 0.3164    |
| Burned Peak Flow Rate (cfs)                         | 0.3164    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0598    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 2605.0981 |



## Peak Flow Hydrologic Analysis

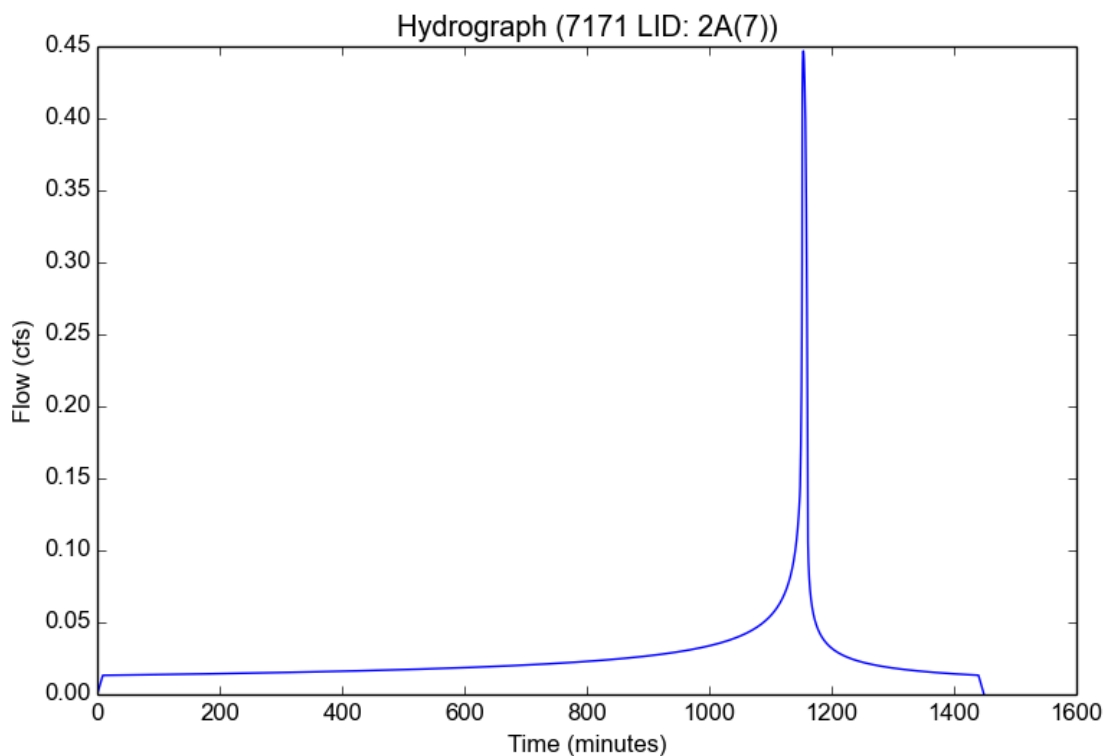
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 2A(7)                 |
| Area (ac)                           | 1.66                  |
| Flow Path Length (ft)               | 166.0                 |
| Flow Path Slope (vft/hft)           | 0.24                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.25                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.5431    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.3608    |
| Developed Runoff Coefficient (Cd)                   | 0.4956    |
| Time of Concentration (min)                         | 9.0       |
| Clear Peak Flow Rate (cfs)                          | 0.4468    |
| Burned Peak Flow Rate (cfs)                         | 0.4468    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0512    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 2230.4417 |





## Peak Flow Hydrologic Analysis

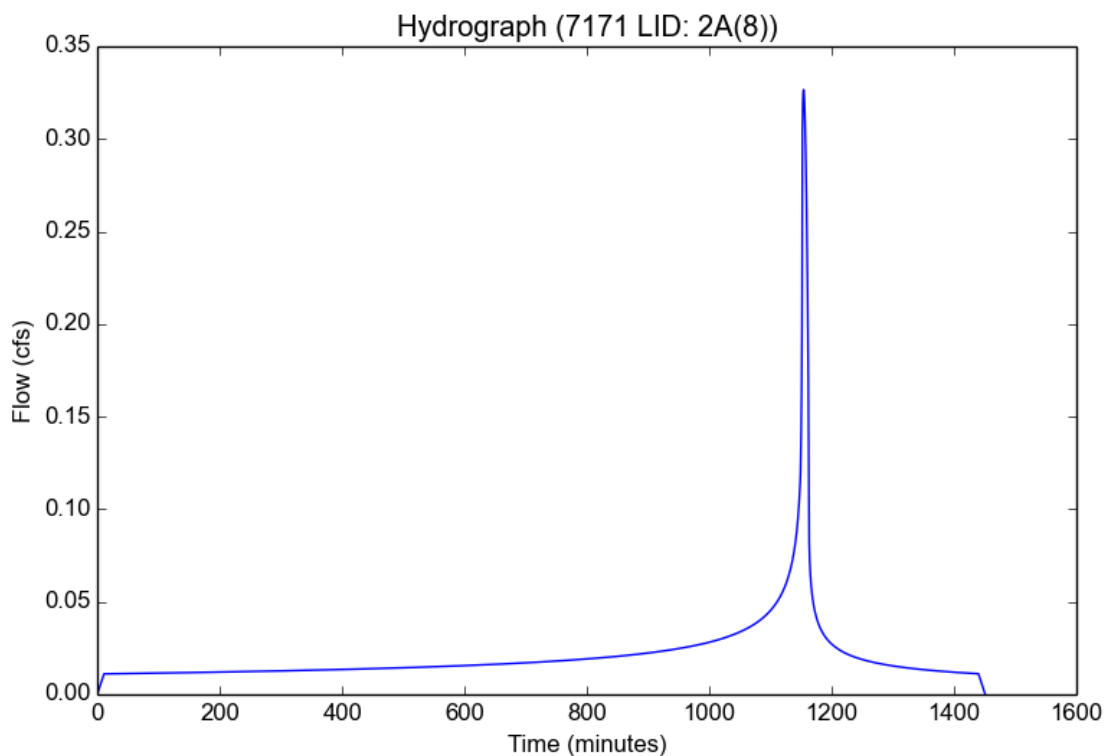
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 2A(8)                 |
| Area (ac)                           | 1.39                  |
| Flow Path Length (ft)               | 255.0                 |
| Flow Path Slope (vft/hft)           | 0.35                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.25                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.4942    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.3339    |
| Developed Runoff Coefficient (Cd)                   | 0.4754    |
| Time of Concentration (min)                         | 11.0      |
| Clear Peak Flow Rate (cfs)                          | 0.3266    |
| Burned Peak Flow Rate (cfs)                         | 0.3266    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0427    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 1861.1112 |



## Peak Flow Hydrologic Analysis

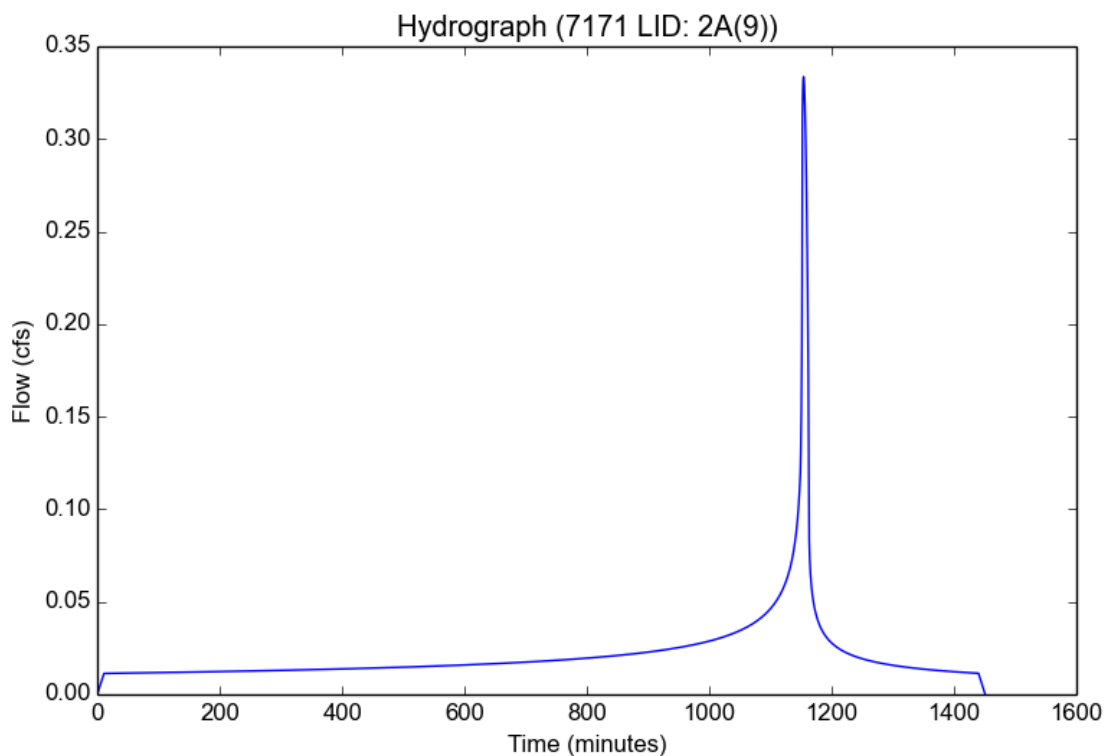
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 2A(9)                 |
| Area (ac)                           | 1.42                  |
| Flow Path Length (ft)               | 266.0                 |
| Flow Path Slope (vft/hft)           | 0.45                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.25                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |          |
|-----------------------------------------------------|----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2      |
| Peak Intensity (in/hr)                              | 0.4942   |
| Undeveloped Runoff Coefficient (Cu)                 | 0.3339   |
| Developed Runoff Coefficient (Cd)                   | 0.4754   |
| Time of Concentration (min)                         | 11.0     |
| Clear Peak Flow Rate (cfs)                          | 0.3336   |
| Burned Peak Flow Rate (cfs)                         | 0.3336   |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0436   |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 1901.279 |



## Peak Flow Hydrologic Analysis

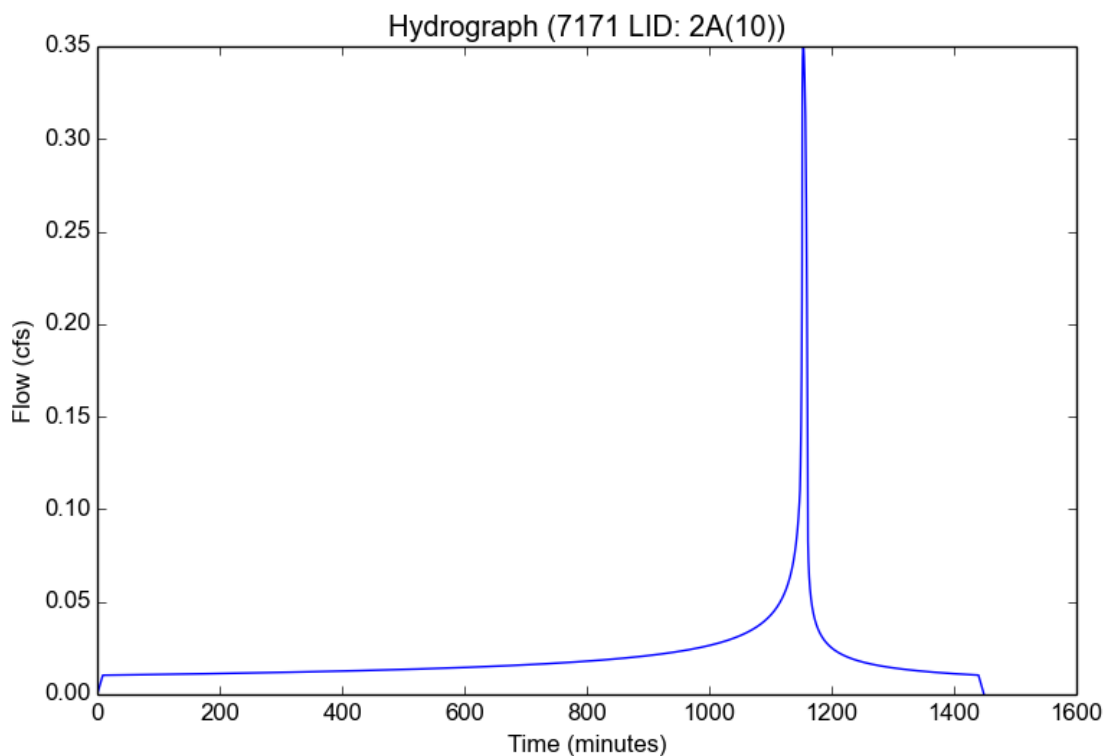
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 2A(10)                |
| Area (ac)                           | 1.3                   |
| Flow Path Length (ft)               | 166.0                 |
| Flow Path Slope (vft/hft)           | 0.26                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.25                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.5431    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.3608    |
| Developed Runoff Coefficient (Cd)                   | 0.4956    |
| Time of Concentration (min)                         | 9.0       |
| Clear Peak Flow Rate (cfs)                          | 0.3499    |
| Burned Peak Flow Rate (cfs)                         | 0.3499    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0401    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 1746.7314 |



## Peak Flow Hydrologic Analysis

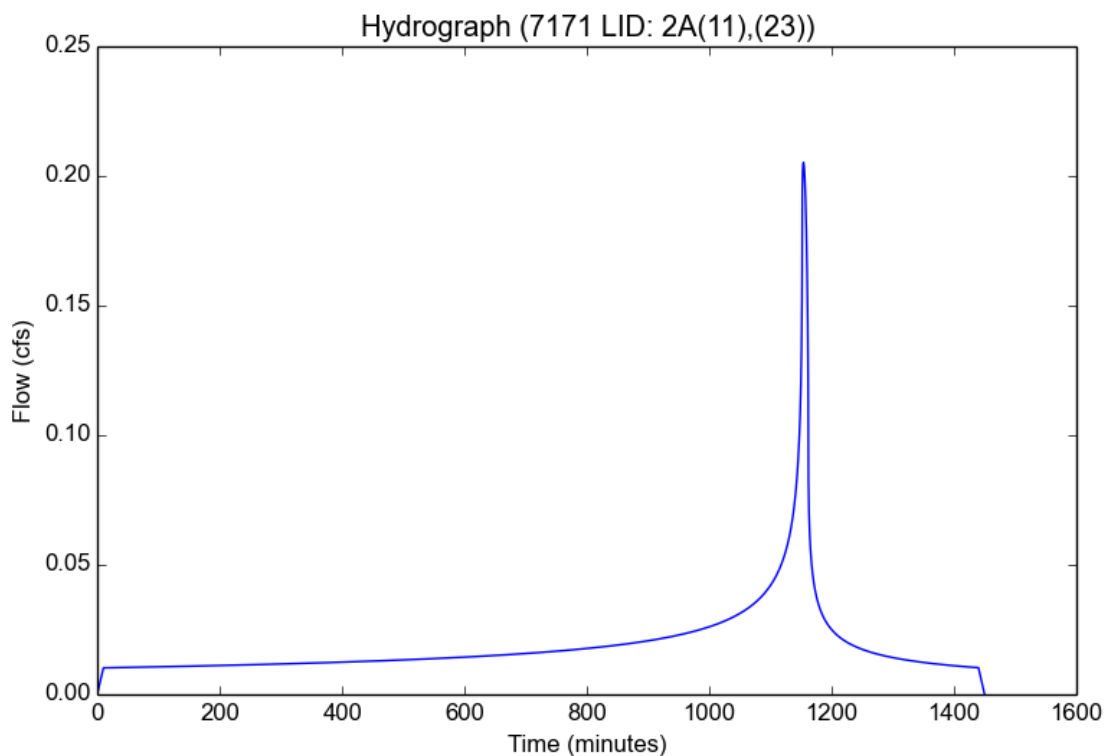
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171 LID Output R  
Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 2A(11),(23)           |
| Area (ac)                           | 0.47                  |
| Flow Path Length (ft)               | 272.0                 |
| Flow Path Slope (vft/hft)           | 0.08                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.9                   |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |          |
|-----------------------------------------------------|----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2      |
| Peak Intensity (in/hr)                              | 0.5169   |
| Undeveloped Runoff Coefficient (Cu)                 | 0.3483   |
| Developed Runoff Coefficient (Cd)                   | 0.8448   |
| Time of Concentration (min)                         | 10.0     |
| Clear Peak Flow Rate (cfs)                          | 0.2052   |
| Burned Peak Flow Rate (cfs)                         | 0.2052   |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0383   |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 1667.793 |



## Peak Flow Hydrologic Analysis

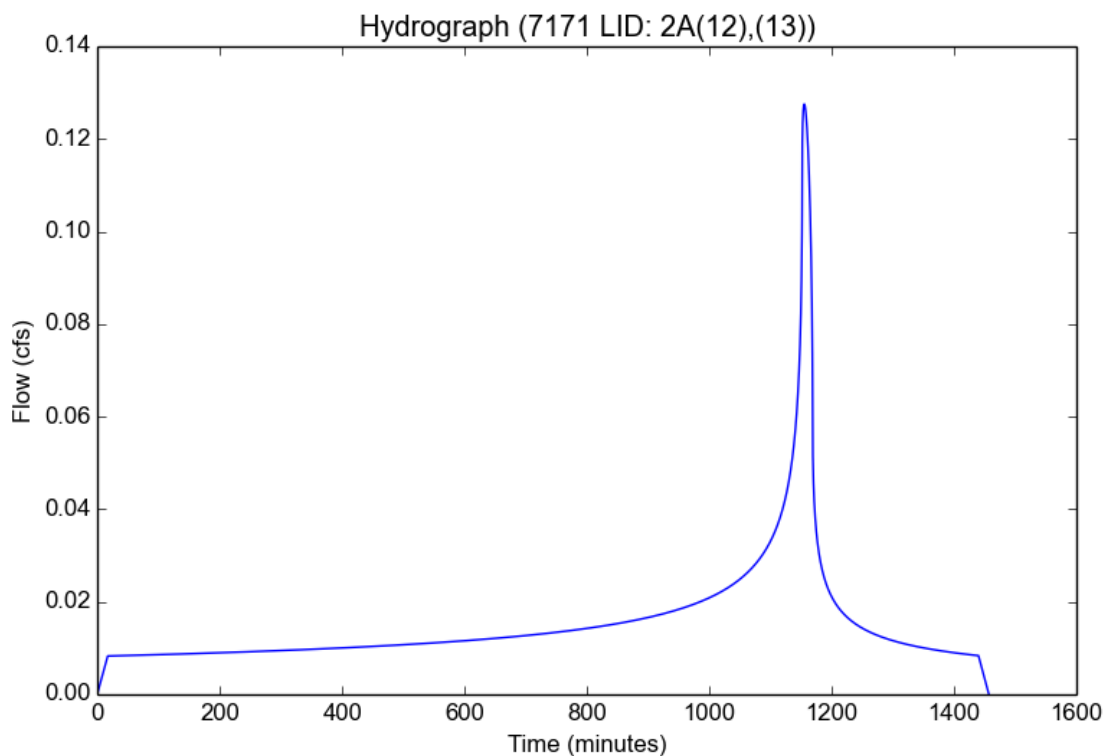
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171 LID Output R  
Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 2A(12),(13)           |
| Area (ac)                           | 0.38                  |
| Flow Path Length (ft)               | 546.0                 |
| Flow Path Slope (vft/hft)           | 0.05                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.9                   |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.4028    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.2317    |
| Developed Runoff Coefficient (Cd)                   | 0.8332    |
| Time of Concentration (min)                         | 17.0      |
| Clear Peak Flow Rate (cfs)                          | 0.1275    |
| Burned Peak Flow Rate (cfs)                         | 0.1275    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0309    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 1347.4535 |



## Peak Flow Hydrologic Analysis

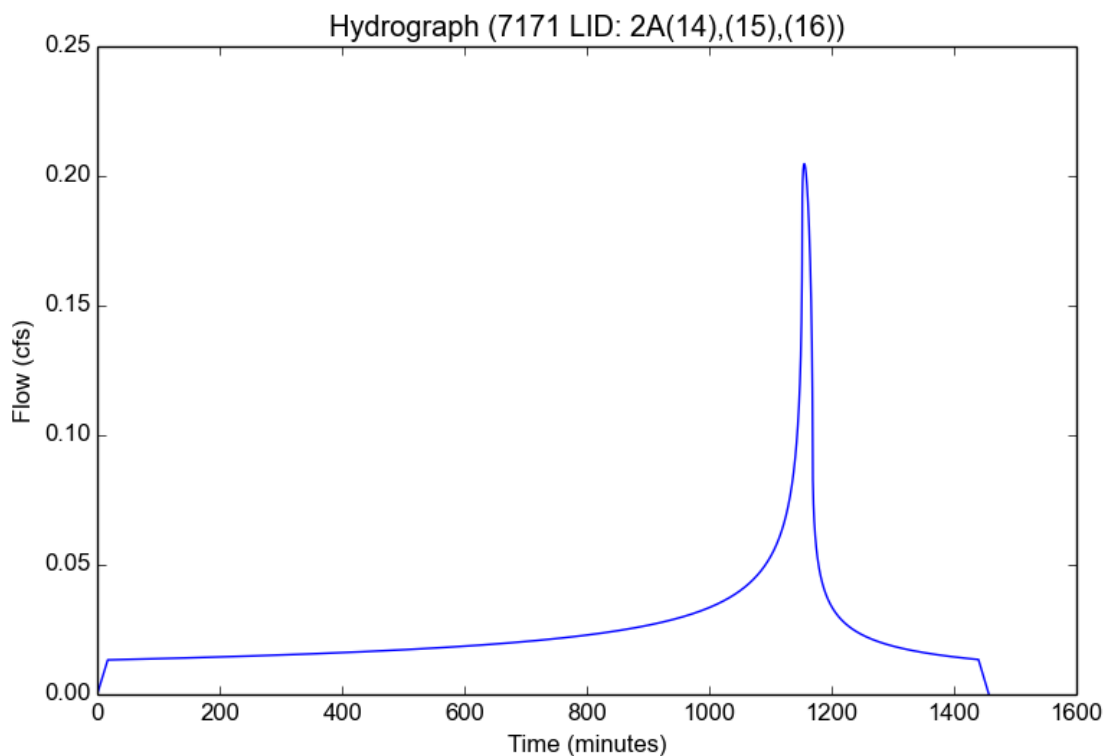
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171 LID Output R  
Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 2A(14),(15),(16)      |
| Area (ac)                           | 0.61                  |
| Flow Path Length (ft)               | 621.0                 |
| Flow Path Slope (vft/hft)           | 0.075                 |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.9                   |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.4028    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.2317    |
| Developed Runoff Coefficient (Cd)                   | 0.8332    |
| Time of Concentration (min)                         | 17.0      |
| Clear Peak Flow Rate (cfs)                          | 0.2047    |
| Burned Peak Flow Rate (cfs)                         | 0.2047    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0497    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 2163.0175 |



## Peak Flow Hydrologic Analysis

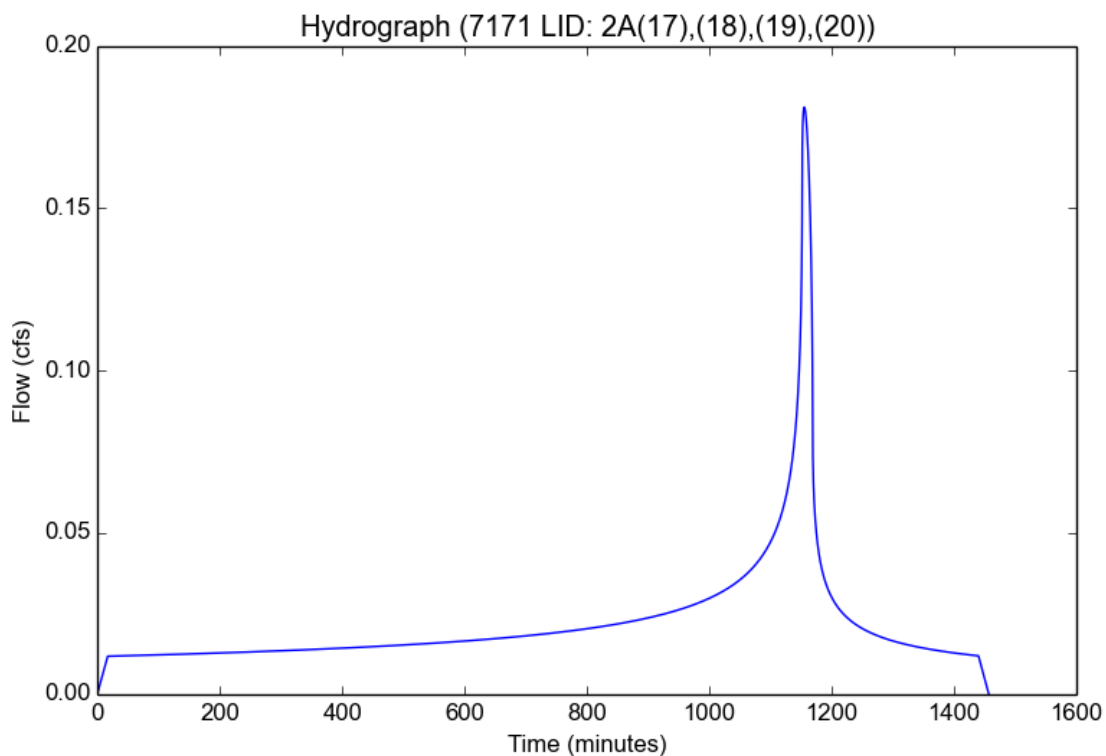
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171 LID Output R  
Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 2A(17),(18),(19),(20) |
| Area (ac)                           | 0.54                  |
| Flow Path Length (ft)               | 727.0                 |
| Flow Path Slope (vft/hft)           | 0.14                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.9                   |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.4028    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.2317    |
| Developed Runoff Coefficient (Cd)                   | 0.8332    |
| Time of Concentration (min)                         | 17.0      |
| Clear Peak Flow Rate (cfs)                          | 0.1812    |
| Burned Peak Flow Rate (cfs)                         | 0.1812    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.044     |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 1914.8024 |



## Peak Flow Hydrologic Analysis

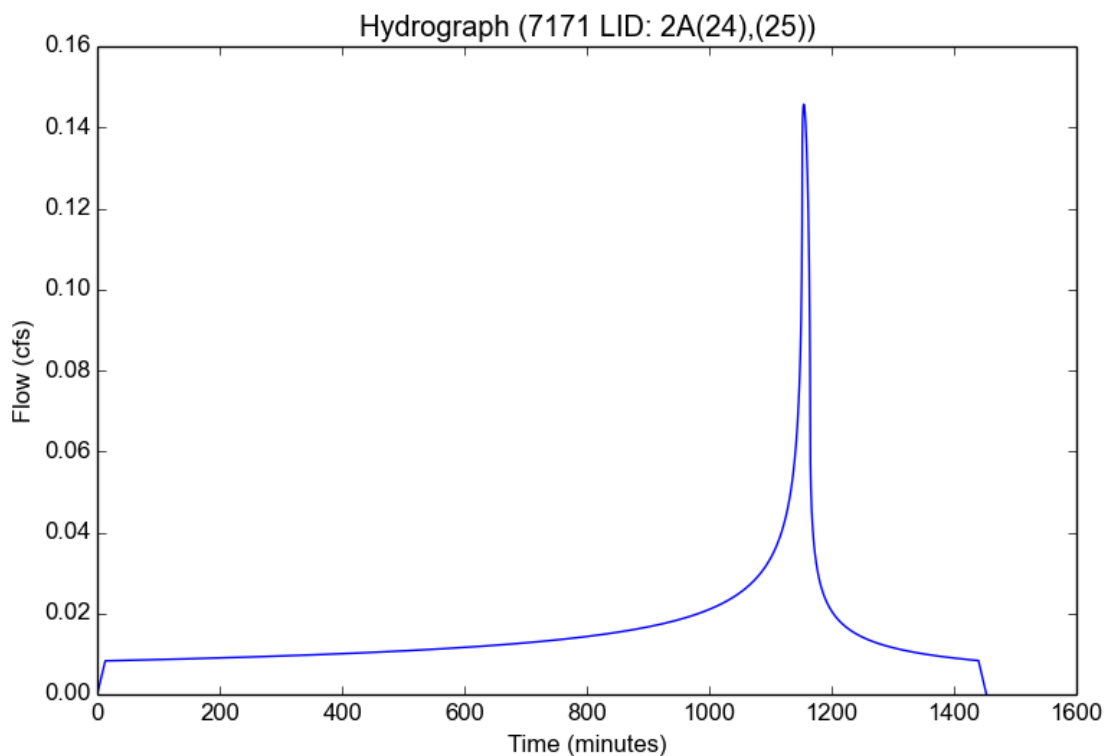
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171 LID Output R  
Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 2A(24),(25)           |
| Area (ac)                           | 0.38                  |
| Flow Path Length (ft)               | 461.0                 |
| Flow Path Slope (vft/hft)           | 0.13                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.9                   |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.4569    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.2921    |
| Developed Runoff Coefficient (Cd)                   | 0.8392    |
| Time of Concentration (min)                         | 13.0      |
| Clear Peak Flow Rate (cfs)                          | 0.1457    |
| Burned Peak Flow Rate (cfs)                         | 0.1457    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0309    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 1347.9771 |





## Peak Flow Hydrologic Analysis

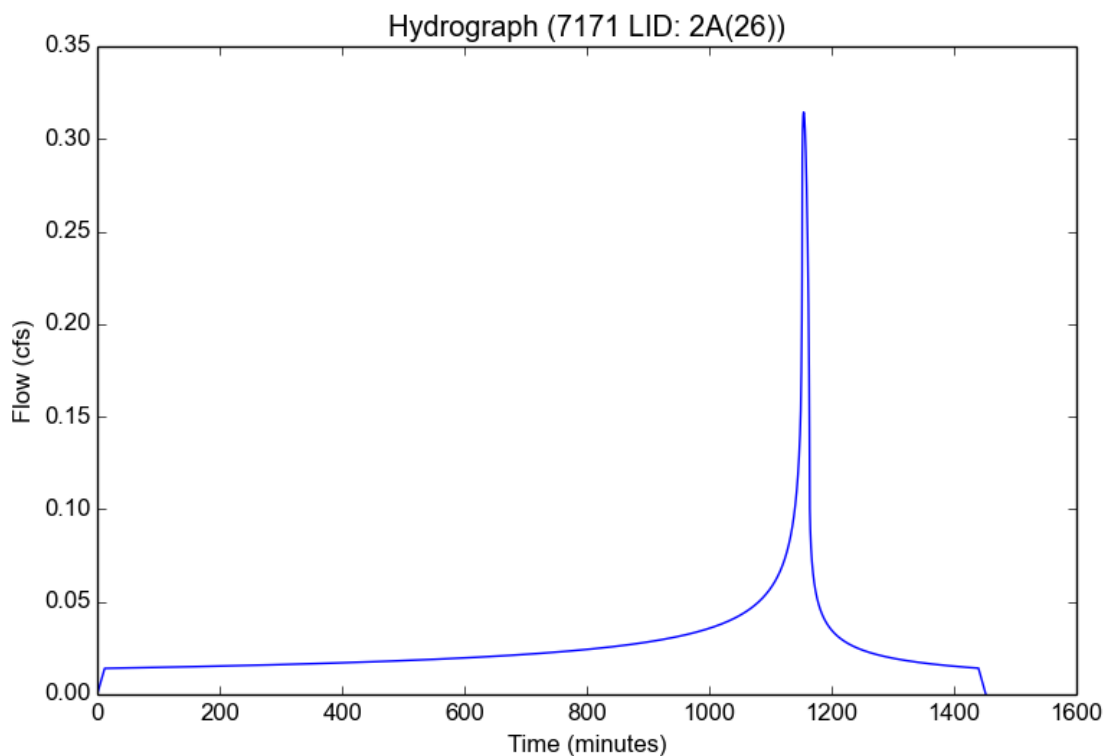
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 2A(26)                |
| Area (ac)                           | 1.15                  |
| Flow Path Length (ft)               | 343.0                 |
| Flow Path Slope (vft/hft)           | 0.26                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.45                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.4744    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.3117    |
| Developed Runoff Coefficient (Cd)                   | 0.5764    |
| Time of Concentration (min)                         | 12.0      |
| Clear Peak Flow Rate (cfs)                          | 0.3145    |
| Burned Peak Flow Rate (cfs)                         | 0.3145    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0532    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 2318.7997 |



## Peak Flow Hydrologic Analysis

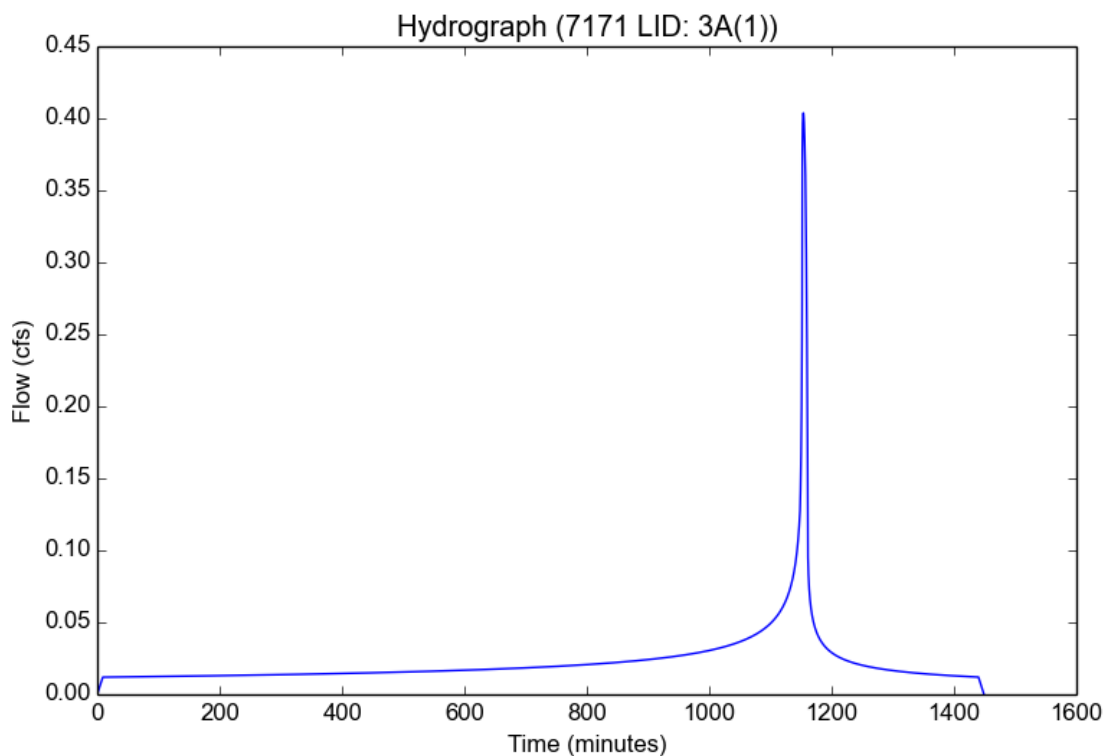
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 3A(1)                 |
| Area (ac)                           | 1.5                   |
| Flow Path Length (ft)               | 200.0                 |
| Flow Path Slope (vft/hft)           | 0.45                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.25                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.5431    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.3608    |
| Developed Runoff Coefficient (Cd)                   | 0.4956    |
| Time of Concentration (min)                         | 9.0       |
| Clear Peak Flow Rate (cfs)                          | 0.4037    |
| Burned Peak Flow Rate (cfs)                         | 0.4037    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0463    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 2015.4594 |



## Peak Flow Hydrologic Analysis

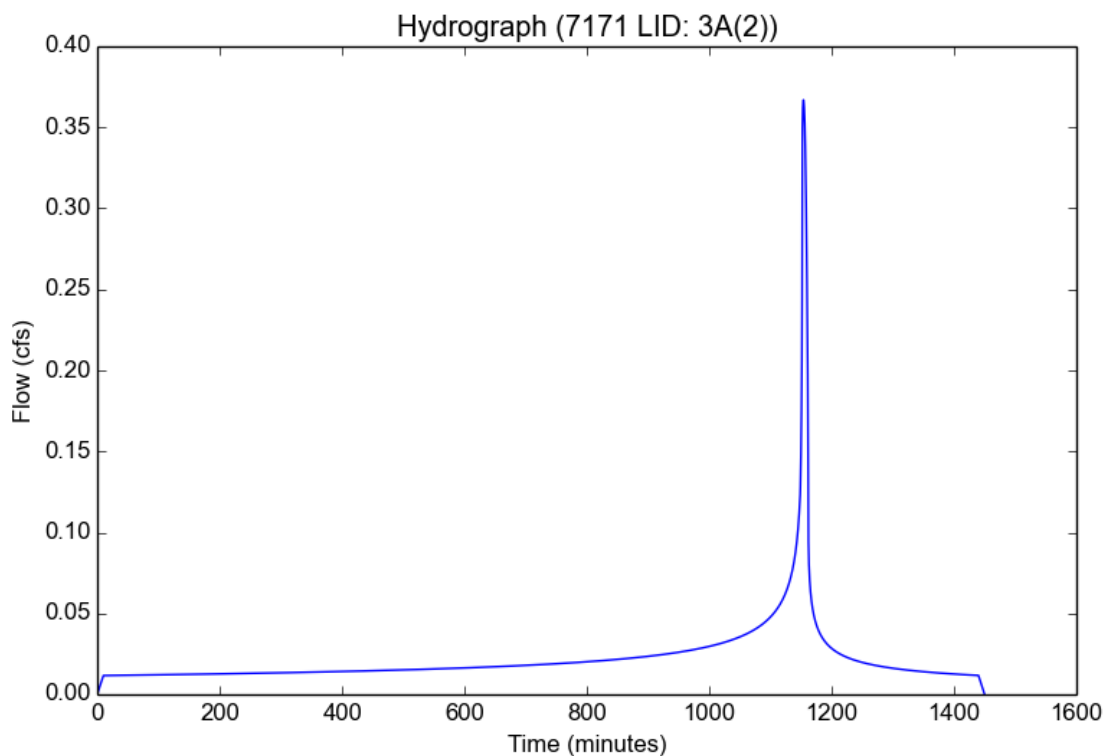
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Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 3A(2)                 |
| Area (ac)                           | 1.46                  |
| Flow Path Length (ft)               | 230.0                 |
| Flow Path Slope (vft/hft)           | 0.45                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.25                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.5169    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.3483    |
| Developed Runoff Coefficient (Cd)                   | 0.4862    |
| Time of Concentration (min)                         | 10.0      |
| Clear Peak Flow Rate (cfs)                          | 0.3669    |
| Burned Peak Flow Rate (cfs)                         | 0.3669    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.045     |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 1958.8626 |



## Peak Flow Hydrologic Analysis

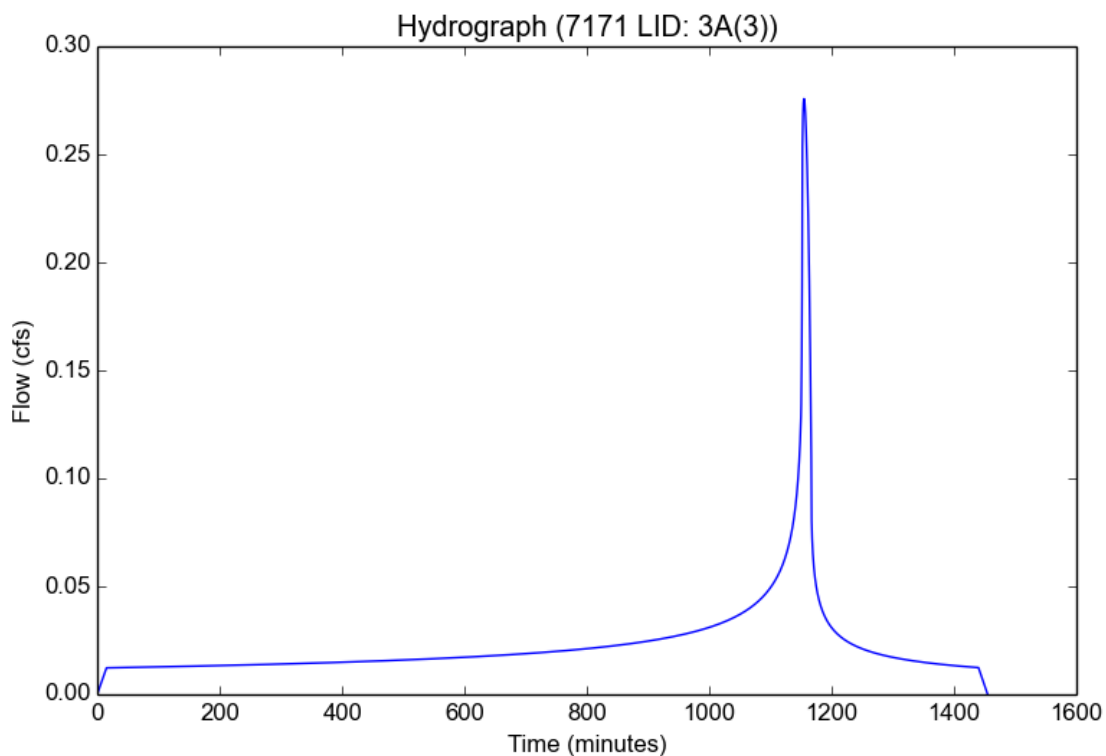
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171 LID Output R  
Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 3A(3)                 |
| Area (ac)                           | 1.54                  |
| Flow Path Length (ft)               | 376.0                 |
| Flow Path Slope (vft/hft)           | 0.45                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.25                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

### Output Results

|                                                     |          |
|-----------------------------------------------------|----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2      |
| Peak Intensity (in/hr)                              | 0.4272   |
| Undeveloped Runoff Coefficient (Cu)                 | 0.2589   |
| Developed Runoff Coefficient (Cd)                   | 0.4192   |
| Time of Concentration (min)                         | 15.0     |
| Clear Peak Flow Rate (cfs)                          | 0.2758   |
| Burned Peak Flow Rate (cfs)                         | 0.2758   |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0469   |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 2044.018 |



## Peak Flow Hydrologic Analysis

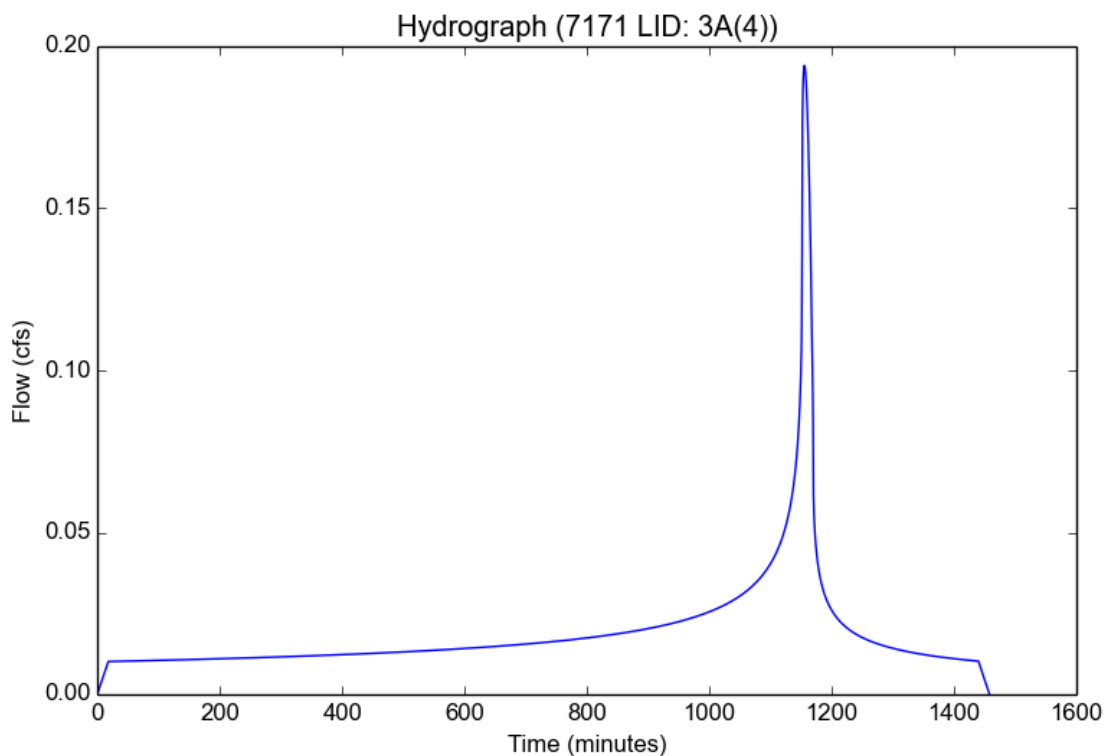
File location: //tsclient/X/LCE GROUP/Civil/JOBS/7100/7171 9712 Oak Pass Hotel-Residential/CIVIL/CALC/Hydrology LID/HydroCalc/7171 LID Output R  
Version: HydroCalc 0.3.1

### Input Parameters

|                                     |                       |
|-------------------------------------|-----------------------|
| Project Name                        | 7171 LID              |
| Subarea ID                          | 3A(4)                 |
| Area (ac)                           | 1.27                  |
| Flow Path Length (ft)               | 470.0                 |
| Flow Path Slope (vft/hft)           | 0.45                  |
| 85th Percentile Rainfall Depth (in) | 1.2                   |
| Percent Impervious                  | 0.25                  |
| Soil Type                           | 42                    |
| Design Storm Frequency              | 85th percentile storm |
| Fire Factor                         | 0                     |
| LID                                 | True                  |

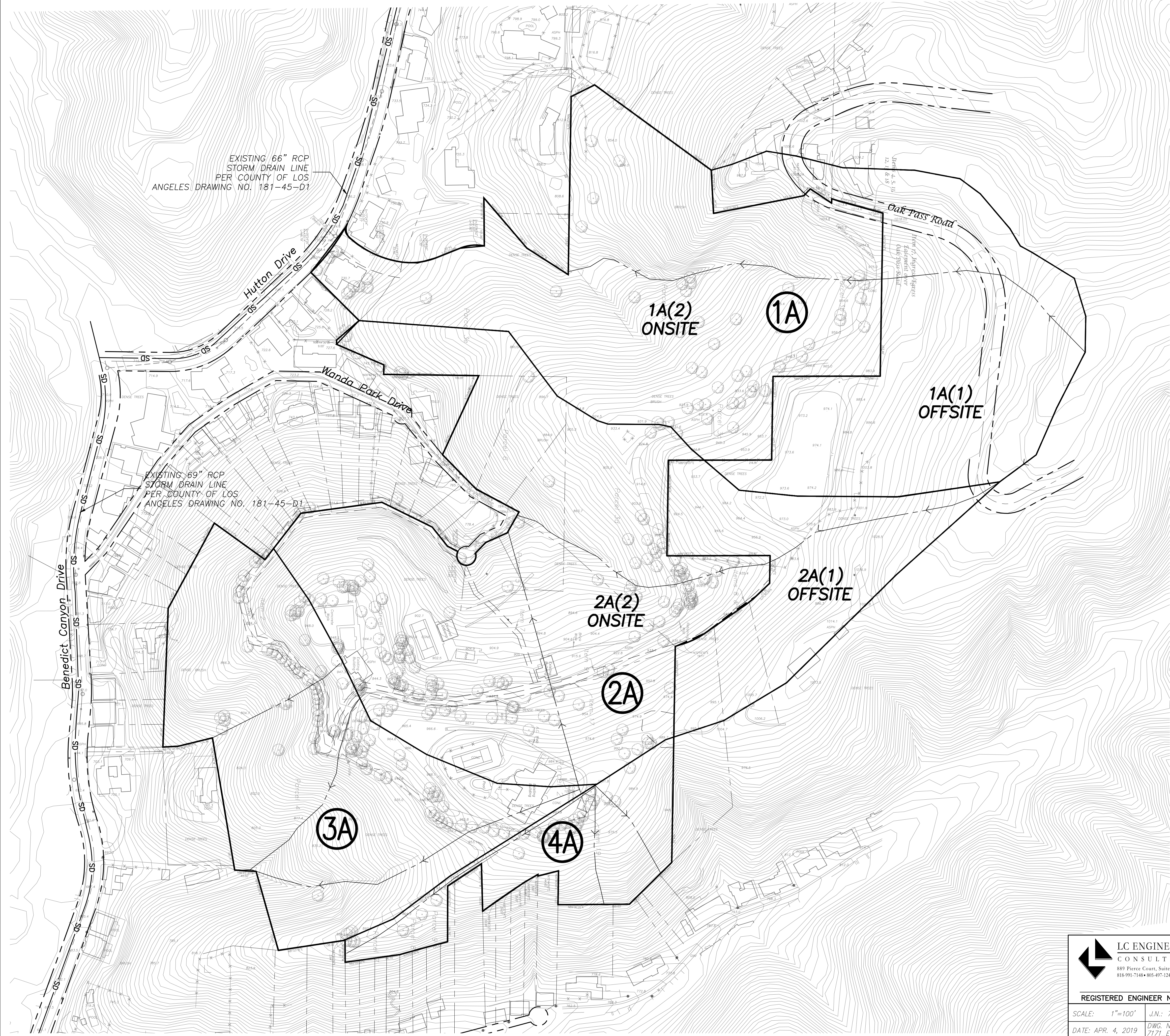
### Output Results

|                                                     |           |
|-----------------------------------------------------|-----------|
| Modeled (85th percentile storm) Rainfall Depth (in) | 1.2       |
| Peak Intensity (in/hr)                              | 0.3921    |
| Undeveloped Runoff Coefficient (Cu)                 | 0.2197    |
| Developed Runoff Coefficient (Cd)                   | 0.3898    |
| Time of Concentration (min)                         | 18.0      |
| Clear Peak Flow Rate (cfs)                          | 0.1941    |
| Burned Peak Flow Rate (cfs)                         | 0.1941    |
| 24-Hr Clear Runoff Volume (ac-ft)                   | 0.0385    |
| 24-Hr Clear Runoff Volume (cu-ft)                   | 1676.5483 |



# **APPENDIX D**





LEGEND

1A SUBAREA DESIGNATION

SUBAREA BOUNDARY

1A(4) INTERIOR AREA DESIGNATION

INTERIOR AREA BOUNDARY

FLOW PATH

Existing Condition Runoff Summary

Soil Number: 42  
24-Hour 50-Year Rainfall Isohyet: 7.3

| Subarea Name | Area    |       | Elevation (ft) |            | Length (ft) | Slope    | Q50    | Q100   |
|--------------|---------|-------|----------------|------------|-------------|----------|--------|--------|
|              | sf      | ac    | Upstream       | Downstream |             |          | cfs    | cfs    |
| 1A           | 761176  | 17.47 | 1096           | 780        | 1334.86     | 0.236729 | 51.79  | 64.28  |
| 2A           | 715080  | 16.42 | 1096           | 796        | 1358.27     | 0.220869 | 48.81  | 60.54  |
| 3A           | 343419  | 7.88  | 1004           | 740        | 772.8       | 0.341615 | 28.02  | 32.04  |
| 4A           | 101009  | 2.32  | 1001.8         | 880        | 627.33      | 0.194156 | 8.25   | 9.43   |
| Total        | 1920683 | 44.09 |                |            |             |          | 136.87 | 166.30 |

Area 1A

q50 = 2.96 cfs/ac  
q100 = 3.68 cfs/ac

| Subarea Name  | Area   |        | Q50 (cfs) | Q100 (cfs) |
|---------------|--------|--------|-----------|------------|
|               | sf     | ac     |           |            |
| 1A(1) OFFSITE | 314053 | 7.210  | 21.369    | 26.522     |
| 1A(2) ONSITE  | 447123 | 10.265 | 37.760    | 37.760     |
| Total         | 761176 | 17.474 | 59.130    | 64.283     |

Area 3A

q50 = 3.55 cfs/ac  
q100 = 4.06 cfs/ac

| Subarea Name | Area      |      | Q50 (cfs) | Q100 (cfs) |
|--------------|-----------|------|-----------|------------|
|              | sf        | ac   |           |            |
| 3A ONSITE    | 343418.70 | 7.88 | 28.02     | 32.04      |

Area 2A

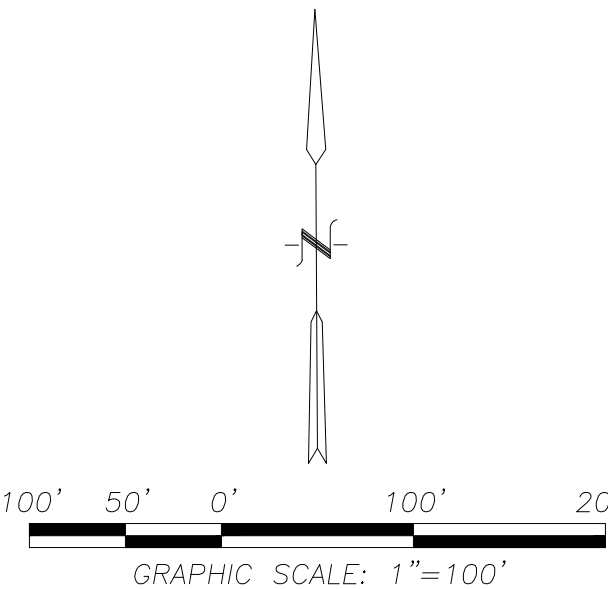
q50 = 2.97 cfs/ac  
q100 = 3.69 cfs/ac

| Subarea Name  | Area   |       | Q50 (cfs) | Q100 (cfs) |
|---------------|--------|-------|-----------|------------|
|               | sf     | ac    |           |            |
| 2A(1) OFFSITE | 182831 | 4.20  | 12.48     | 15.48      |
| 2A(2) ONSITE  | 532249 | 12.22 | 45.06     | 45.06      |
| Total         | 715080 | 16.42 | 57.54     | 60.54      |

Area 4A

q50 = 3.56 cfs/ac  
q100 = 4.07 cfs/ac

| Subarea Name | Area      |      | Q50 (cfs) | Q100 (cfs) |
|--------------|-----------|------|-----------|------------|
|              | sf        | ac   |           |            |
| 4A ONSITE    | 101009.00 | 2.32 | 8.25      | 9.43       |



REGISTERED ENGINEER NO. 31902 DATE

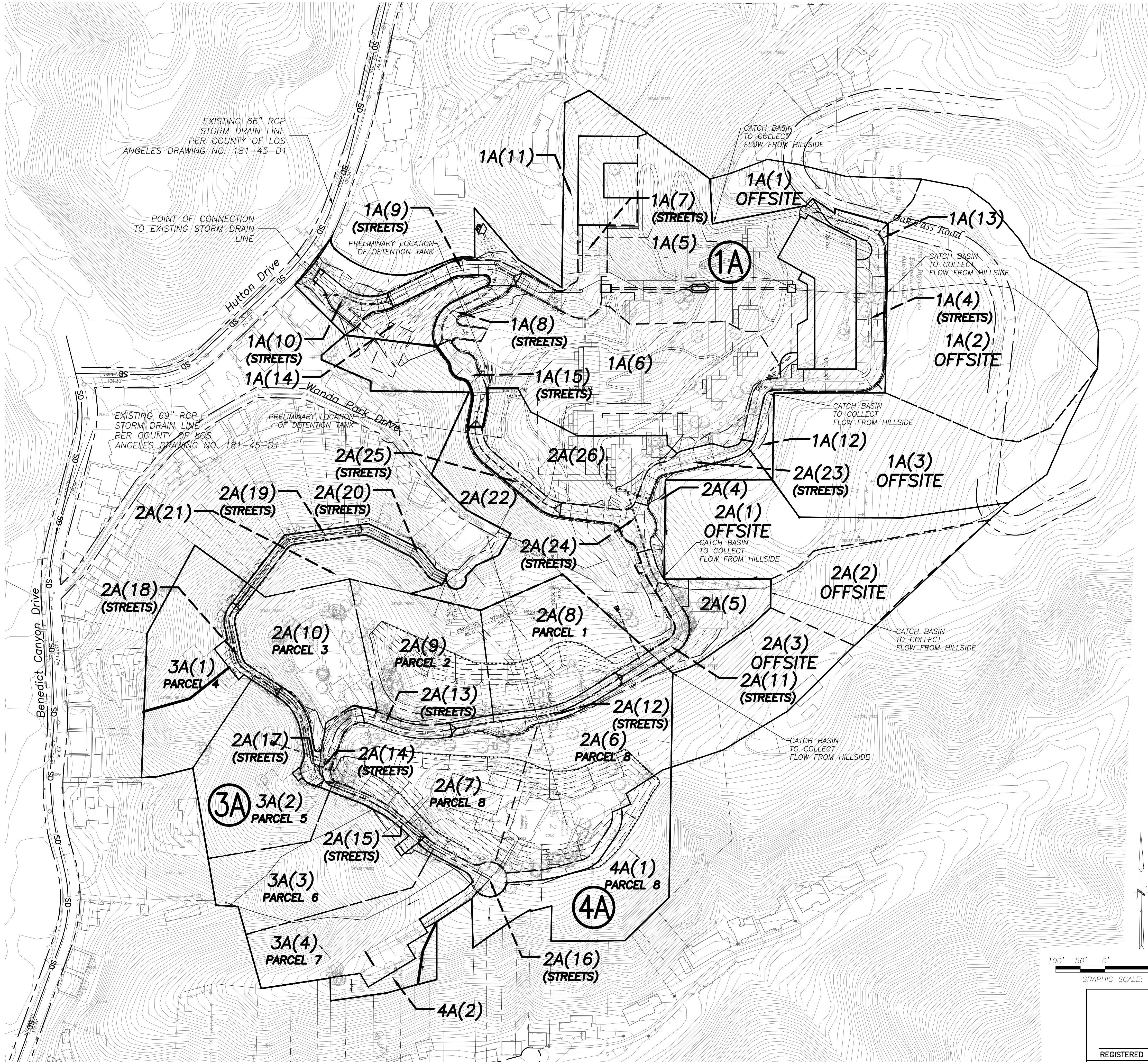
SCALE: 1"=100' J.N.: 7171  
DATE: APR. 4, 2019 DWG. NAME: 7171\_Existing Condition Hydro Exhibit.dwg

Existing Condition Hydrology Exhibit  
FOR  
The Retreat at Benedict Canyon

9712 OAK PASS ROAD  
LOS ANGELES, CA 90210

APPENDIX  
D  
FIGURE  
1





LEGEND

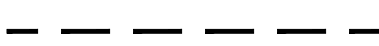


SUBAREA DESIGNATION

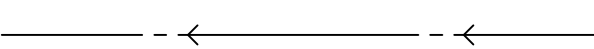
SUBAREA BOUNDARY

1A(4)

INTERIOR AREA DESIGNATION



INTERIOR AREA BOUNDARY



FLOW PATH

Developed Condition Runoff Summary

Soil Number: 42  
24-Hour 50-Year Rainfall Isohyet: 7.3

| Subarea Name | Area     |       | Elevation (ft) |            | Length (ft) | Slope | Q50    |        | Q100   |        | Increase |      |
|--------------|----------|-------|----------------|------------|-------------|-------|--------|--------|--------|--------|----------|------|
|              | sf       | ac    | Upstream       | Downstream |             |       | cfs    |        | cfs    |        | Q50      | Q100 |
| 1A           | 757406.3 | 17.39 | 1096           | 780        | 1334.9      | 0.24  | 52.90  | 65.24  | 1.10   | 0.96   |          |      |
| 2A           | 838378.3 | 19.25 | 1096           | 796        | 1084.9      | 0.28  | 58.55  | 72.22  | 9.75   | 11.68  |          |      |
| 3A           | 251371.2 | 5.77  | 960            | 740        | 772.8       | 0.28  | 20.94  | 23.85  | (7.08) | (8.19) |          |      |
| 4A           | 73527.5  | 1.69  | 1001.8         | 880        | 520.69      | 0.23  | 6.13   | 6.99   | (2.12) | (2.45) |          |      |
| Total        | 1920683  | 44.09 | 992            | 892        | 167.06      | 0.60  | 138.53 | 168.30 | 1.66   | 2.00   |          |      |

1920683

Area 1A

q50 = 3.04 cfs/ac  
q100 = 3.75 cfs/ac

| Subarea Name     | Area    |       | Q50 (cfs) | Q100 (cfs) |
|------------------|---------|-------|-----------|------------|
|                  | sf      | ac    |           |            |
| 1A(1) OFFSITE    | 35409.1 | 0.81  | 2.47      | 3.05       |
| 1A(2) OFFSITE    | 164128  | 3.77  | 11.46     | 14.14      |
| 1A(3) OFFSITE    | 114245  | 2.62  | 7.98      | 9.84       |
| 1A(4) STREET     | 32381.5 | 0.74  | 2.26      | 2.79       |
| 1A(5) SITE       | 165666  | 3.80  | 11.57     | 14.27      |
| 1A(6) SITE       | 134388  | 3.09  | 9.39      | 11.58      |
| 1A(7) STREET     | 15018.4 | 0.34  | 1.05      | 1.29       |
| 1A(8) STREET     | 8060.13 | 0.19  | 0.56      | 0.69       |
| 1A(9) STREET     | 9488.75 | 0.22  | 0.66      | 0.82       |
| 1A(10) STREET    | 7214.19 | 0.17  | 0.50      | 0.62       |
| 1A(11) HEET FLOW | 40261.1 | 0.92  | 2.81      | 3.47       |
| 1A(12) SITE/LS   | 6264.98 | 0.14  | 0.44      | 0.54       |
| 1A(13) SITE/LS   | 1694.02 | 0.04  | 0.12      | 0.15       |
| 1A(14) LS/STREET | 16240.1 | 0.37  | 1.13      | 1.40       |
| 1A(15) STREET    | 6946.12 | 0.16  | 0.49      | 0.60       |
| Total            | 757406  | 17.39 | 52.90     | 65.24      |

Area 2A

q50 = 3.04 cfs/ac  
q100 = 3.75 cfs/ac

| Subarea Name    | Area    |       | Q50 (cfs) | Q100 (cfs) |
|-----------------|---------|-------|-----------|------------|
|                 | sf      | ac    |           |            |
| 2A(1) OFFSITE   | 70267.4 | 1.61  | 4.91      | 6.05       |
| 2A(2) OFFSITE   | 50855.1 | 1.17  | 3.55      | 4.38       |
| 2A(3) OFFSITE   | 61708.5 | 1.42  | 4.31      | 5.32       |
| 2A(4) SITE/LS   | 11337.4 | 0.26  | 0.79      | 0.98       |
| 2A(5) SITE      | 22812.4 | 0.52  | 1.59      | 1.97       |
| 2A(6) PARCEL 8  | 85898.8 | 1.97  | 6.00      | 7.40       |
| 2A(7) PARCEL 8  | 72509.7 | 1.66  | 5.06      | 6.25       |
| 2A(8) PARCEL 1  | 60410.6 | 1.39  | 4.22      | 5.20       |
| 2A(9) PARCEL 2  | 61910.1 | 1.42  | 4.32      | 5.33       |
| 2A(10) PARCEL 3 | 56791.4 | 1.30  | 3.97      | 4.89       |
| 2A(11) STREET   | 12052.8 | 0.28  | 0.84      | 1.04       |
| 2A(12) STREET   | 11492.6 | 0.26  | 0.80      | 0.99       |
| 2A(13) STREET   | 5193.42 | 0.12  | 0.36      | 0.45       |
| 2A(14) STREET   | 5510.68 | 0.13  | 0.38      | 0.47       |
| 2A(15) STREET   | 5762.65 | 0.13  | 0.40      | 0.50       |
| 2A(16) STREET   | 15271.3 | 0.35  | 1.07      | 1.32       |
| 2A(17) STREET   | 5761.3  | 0.13  | 0.40      | 0.50       |
| 2A(18) STREET   | 6076.35 | 0.14  | 0.42      | 0.52       |
| 2A(19) STREET   | 6893.98 | 0.16  | 0.48      | 0.59       |
| 2A(20) STREET   | 4575.33 | 0.11  | 0.32      | 0.39       |
| 2A(21) LS/      | 27746.3 | 0.64  | 1.94      | 2.39       |
| 2A(22) LS/      | 102731  | 2.36  | 7.18      | 8.85       |
| 2A(23) STREET   | 8260.06 | 0.19  | 0.58      | 0.71       |
| 2A(24) STREET   | 9031.83 | 0.21  | 0.63      | 0.78       |
| 2A(25) STREET   | 7578.8  | 0.17  | 0.53      | 0.65       |
| 2A(26) SITE     | 49938.4 | 1.15  | 3.49      | 4.30       |
| Total           | 838378  | 19.25 | 58.55     | 72.22      |

Area 3A

q50 = 3.63 cfs/ac  
q100 = 4.13 cfs/ac

| Subarea Name   | Area      |      | Q50 (cfs) | Q100 (cfs) |
|----------------|-----------|------|-----------|------------|
|                | sf        | ac   |           |            |
| 3A(1) PARCEL 4 | 65190.36  | 1.50 | 5.43      | 6.18       |
| 3A(2) PARCEL 5 | 63743.93  | 1.46 | 5.31      | 6.05       |
| 3A(3) PARCEL 6 | 67207.79  | 1.54 | 5.60      | 6.38       |
| 3A(4) PARCEL 7 | 55262.02  | 1.27 | 4.60      | 5.24       |
| Total          | 251404.10 | 5.77 | 20.95     | 23.85      |

Area 4A

q50 = 3.63 cfs/ac  
q100 = 4.14 cfs/ac

| Subarea Name   | Area     |      | Q50 (cfs) | Q100 (cfs) |
|----------------|----------|------|-----------|------------|
|                | sf       | ac   |           |            |
| 4A(1) PARCEL 8 | 61797.60 | 1.42 | 5.16      | 5.87       |
| 4A(2) SITE/LS  | 11729.90 | 0.27 | 0.98      | 1.11       |
| TOTAL          | 73527.50 | 1.69 | 6.13      | 6.99       |

100' 50' 0' 100' 200'  
GRAPHIC SCALE: 1"=100'

REGISTERED ENGINEER NO. 31902 DATE

SCALE: 1"=100' J.N.: 7171

DATE: APR. 4, 2019 DWG. NAME: 7171\_Developed Condition Hydro Exhibit.dwg

Developed Condition Hydrology & LID Exhibit  
FOR  
The Retreat at Benedict Canyon

9712 OAK PASS ROAD  
LOS ANGELES, CA 90210

APPENDIX  
D  
FIGURE  
2