Appendix 5.5 (Continued)

Hydrology (Part 6 of 15)

ATTACHMENT A.1: SWMM INPUT AND OUTPUT FILES

Regional Facility Input File (Facilities A, B, and C)[1] (SWMM 5.1) p. 1-4

Regional Facility Output File (SWMM 5.1) p. 5-8

Representative Stand-alone Parcel-based BMP Case Study (SWMM 5.0) p. 9-14

KEY
Annotation is provided in red text and boxes to help orient the reviewer to the key information contained in each file.

[1] Model calculations for Regional Facility D are provided with the Mission Village Phase 1 Conformance Memorandum

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           10/01/1968
START_TIME           00:00:00
REPORT_START_DATE    10/01/1968
REPORT_START_TIME    00:00:00
END_DATE             10/01/2008
END_TIME             06:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:10:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:00:30

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           0
HEAD_TOLERANCE       0
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          0.03   0.0479 0.0719 0.102  0.132  0.156  0.168  0.15   0.114  0.0781 0.042  0.03
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Newhall          INTENSITY 1:00     1        FILE       "NEWHALL_PATCHED_20091119.NCD" 46162      IN

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnapPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------
A-AB             Newhall          DivA             2.85     60.96    496.13   5        0
A-C              Newhall          DivA             22.45    76.70    3912.14  5        0
B-AB             Newhall          DivB             18.40    72.64    3206.33  5        0
B-C              Newhall          DivB             44.48    56.99    7749.89  5        0
C-AB             Newhall          DivC             0.28     49.53    48.26    5        0
C-C              Newhall          DivC             24.40    50.99    4251.11  5        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
A-AB             0.012      0.25       0.02       0.06       25         OUTLET
A-C              0.012      0.25       0.02       0.06       25         OUTLET
B-AB             0.012      0.25       0.02       0.06       25         OUTLET
B-C              0.012      0.25       0.02       0.06       25         OUTLET
C-AB             0.012      0.25       0.02       0.06       25         OUTLET
C-C              0.012      0.25       0.02       0.06       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
A-AB             8          0.275      0.32
```

This model contains each of the three regional facilities. The tributary areas to these regional facilities are divided along soil unit delineations. Within each soil unit, watershed properties are lumped. This model demonstrates that the regional facilities A, B, and C are sized to infiltration at least 80 percent of average annual runoff. Hydrologic source controls and parcel-based BMPs are not considered in this sizing. Diversion structures are included in the capture efficiency analysis.

```
A-C             8          0.145      0.29
B-AB            8          0.275      0.32
B-C             8          0.145      0.29
C-AB            8          0.275      0.32
C-C             8          0.145      0.29

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
J-DivA-OF       100        0          0          0          0
J-DivB-OF       100        0          0          0          0
J-DivC-OF       100        0          0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
1               0          FREE                        NO
2               0          FREE                        NO
3               0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
DivA            110        D-DivA-OF        CUTOFF     4.66       0          0          0          0
DivB            110        D-DivB-OF        CUTOFF     15         0          0          0          0
DivC            110        D-DivC-OF        CUTOFF     4.5        0          0          0          0

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------          -------- -----
---
FacilityA       100      18         0          TABULAR    FacilityA                    0        0        0.1      3.000    0.1
FacilityB       100      18         0          TABULAR    FacilityB                    0        0        0.1      3.000    0.1
FacilityC       100      18         0          TABULAR    FacilityC                    0        0        0.1      3.000    0.1

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
8               J-DivC-OF        3                10         0.01       0          0          0          0
9               J-DivB-OF        2                10         0.01       0          0          0          0
10              J-DivA-OF        1                10         0.01       0          0          0          0
D-DivA-OF       DivA             J-DivA-OF        20         0.01       0          0          0          0
D-DivA-TR       DivA             FacilityA        20         0.01       0          0          0          0
D-DivB-OF       DivB             J-DivB-OF        20         0.01       0          0          0          0
D-DivB-TR       DivB             FacilityB        20         0.01       0          0          0          0
D-DivC-OF       DivC             J-DivC-OF        20         0.01       0          0          0          0
D-DivC-TR       DivC             FacilityC        20         0.01       0          0          0          0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated    EndCon   EndCoeff   Surcharge
RoadWidth  RoadSurf
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- -------- ---------- ---------- ----
------ ----------
1               FacilityA        1                TRANSVERSE   3          3.33       NO       0        0          YES
2               FacilityB        2                TRANSVERSE   3.75       3.33       NO       0        0          YES
3               FacilityC        3                TRANSVERSE   3.5        3.33       NO       0        0          YES

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
8               DUMMY        0                0          0          0          1
9               DUMMY        0                0          0          0          1
10              DUMMY        0                0          0          0          1
D-DivA-OF       DUMMY        0                0          0          0          1
D-DivA-TR       DUMMY        0                0          0          0          1
D-DivB-OF       DUMMY        0                0          0          0          1
D-DivB-TR       DUMMY        0                0          0          0          1
D-DivC-OF       DUMMY        0                0          0          0          1
D-DivC-TR       DUMMY        0                0          0          0          1
1               RECT_OPEN    10               9.424777961 0          0
2               RECT_OPEN    10               18.84955592 0          0
3               RECT_OPEN    10               9.424777961 0          0

[CURVES]
;;Name           Type       X-Value    Y-Value

2
```

Diversion structure cutoff flowrates.

```
;;-------------- ---------- ---------- ----------
FacilityA        Storage    0.00       24413.00
FacilityA                   0.15       24413.00
FacilityA                   0.24       24413.00
FacilityA                   0.30       24413.00
FacilityA                   0.45       24413.00
FacilityA                   0.60       24413.00
FacilityA                   0.90       24413.00
FacilityA                   1.20       24413.00
FacilityA                   1.50       24413.00
FacilityA                   1.95       24413.00
FacilityA                   2.10       24413.00
FacilityA                   2.25       24413.00
FacilityA                   2.40       24413.00
FacilityA                   2.64       24413.00
FacilityA                   2.70       24413.00
FacilityA                   3.00       24413.00
FacilityA                   10.00      24413.00
;
FacilityB        Storage    0.00       39374.00
FacilityB                   0.19       39374.00
FacilityB                   0.30       39374.00
FacilityB                   0.38       39374.00
FacilityB                   0.56       39374.00
FacilityB                   0.75       39374.00
FacilityB                   1.13       39374.00
FacilityB                   1.50       39374.00
FacilityB                   1.88       39374.00
FacilityB                   2.44       39374.00
FacilityB                   2.63       39374.00
FacilityB                   2.81       39374.00
FacilityB                   3.00       39374.00
FacilityB                   3.30       39374.00
FacilityB                   3.38       39374.00
FacilityB                   3.75       39374.00
FacilityB                   10.00      39374.00
;
FacilityC        Storage    0.00       15515.00
FacilityC                   0.18       15515.00
FacilityC                   0.28       15515.00
FacilityC                   0.35       15515.00
FacilityC                   0.53       15515.00
FacilityC                   0.70       15515.00
FacilityC                   1.05       15515.00
FacilityC                   1.40       15515.00
FacilityC                   1.75       15515.00
FacilityC                   2.28       15515.00
FacilityC                   2.45       15515.00
FacilityC                   2.63       15515.00
FacilityC                   2.80       15515.00
FacilityC                   3.08       15515.00
FacilityC                   3.15       15515.00
FacilityC                   3.50       15515.00
FacilityC                   10.00      15515.00

[REPORT]
;;Reporting Options
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
J-DivA-OF        1577.869           4084.699
J-DivB-OF        4446.721           3961.749
J-DivC-OF        7411.202           3989.071
```

Top of Water Quality Volume at 3 ft.

Top of Water Quality Volume at 3.75 ft.

Top of Water Quality Volume at 3.5 ft.

```
1                993.151            2000.000
2                3773.973           1931.507
3                6787.671           1958.904
DivA             949.454            4521.858
DivB             3777.322           4603.825
DivC             6741.803           4562.842
FacilityA        293.716            4057.377
FacilityB        3066.940           3934.426
FacilityC        6127.049           3907.104

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
A-AB             308.219            7410.959
A-C              1554.795           7465.753
B-AB             3267.123           7410.959
B-C              4294.521           7452.055
C-AB             6404.110           7342.466
C-C              7226.027           7342.466

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Newhall          2806.122           8992.347
```

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.011)

WARNING 08: elevation drop exceeds length for Conduit 8
WARNING 08: elevation drop exceeds length for Conduit 9
WARNING 08: elevation drop exceeds length for Conduit 10

****
Rainfall File Summary
****

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
46162	10/02/1968	12/25/2008	60 min	5324	0	0

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... KINWAVE
Starting Date 10/01/1968 00:00:00
Ending Date 10/01/2008 06:00:00
Antecedent Dry Days 0.0
Report Time Step 00:10:00
Wet Time Step 00:15:00
Dry Time Step 04:00:00
Routing Time Step ..... 30.00 sec

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	6895.087	733.130
Evaporation Loss	192.962	20.517
Infiltration Loss	2300.540	244.608
Surface Runoff	4438.329	471.912
Final Storage	0.000	0.000
Continuity Error (%)	-0.533	

Flow Routing Continuity	Volume acre-feet	Volume 10^6 gal
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	4438.329	1446.296
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	860.406	280.376
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	3579.477	1166.426
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.035	

****
Highest Flow Instability Indexes
****
All links are stable.

****
Routing Time Step Summary
****
Minimum Time Step : 30.00 sec
Average Time Step : 30.00 sec
Maximum Time Step : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
A-AB	733.13	0.00	19.57	273.20	444.12	34.37	3.79	0.606
A-C	733.13	0.00	25.06	148.26	564.27	343.98	31.36	0.770
B-AB	733.13	0.00	23.36	191.22	522.74	261.17	25.10	0.713
B-C	733.13	0.00	18.98	274.93	442.96	535.00	60.46	0.604
C-AB	733.13	0.00	15.92	353.58	366.92	2.79	0.36	0.500
C-C	733.13	0.00	17.16	313.64	405.83	268.88	32.87	0.554

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
J-DivA-OF	JUNCTION	0.00	0.00	100.00	0 00:00	0.00
J-DivB-OF	JUNCTION	0.00	0.00	100.00	0 00:00	0.00
J-DivC-OF	JUNCTION	0.00	0.00	100.00	0 00:00	0.00
1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
3	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
DivA	DIVIDER	0.00	0.00	110.00	0 00:00	0.00
DivB	DIVIDER	0.00	0.00	110.00	0 00:00	0.00
DivC	DIVIDER	0.00	0.00	110.00	0 00:00	0.00
FacilityA	STORAGE	0.01	3.21	103.21	13237 09:08	3.21
FacilityB	STORAGE	0.03	4.09	104.09	9597 13:09	4.09
FacilityC	STORAGE	0.02	3.73	103.73	14339 23:09	3.73

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
J-DivA-OF	JUNCTION	0.00	30.49	10721 20:00	0	59.2	0.000
J-DivB-OF	JUNCTION	0.00	70.55	10721 20:00	0	69.2	0.000
J-DivC-OF	JUNCTION	0.00	28.74	10721 20:00	0	35.8	0.000
1	OUTFALL	0.00	30.49	10721 20:00	0	69.3	0.000
2	OUTFALL	0.00	70.55	10721 20:00	0	157	0.000
3	OUTFALL	0.00	28.74	10721 20:00	0	53.9	0.000
DivA	DIVIDER	35.15	35.15	10721 20:00	378	378	0.000
DivB	DIVIDER	85.55	85.55	10721 20:00	796	796	0.000
DivC	DIVIDER	33.24	33.24	10721 20:00	272	272	0.000
FacilityA	STORAGE	0.00	4.66	110 13:09	0	319	-0.031
FacilityB	STORAGE	0.00	15.00	110 16:10	0	727	-0.043
FacilityC	STORAGE	0.00	4.50	110 13:58	0	236	-0.041

Total Bypass

Total Inflow

****
Node Surcharge Summary
****

No nodes were surcharged.

Example calculation - Facility A
% Capture = 1-(Total Bypass/Total Inflow)
= 1-(69.3/378)
= 81.6%

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
FacilityA	0.362	0	0	97	78.302	18	13237 09:08	4.66
FacilityB	1.300	0	0	88	160.911	23	9597 13:09	15.00
FacilityC	0.353	0	0	92	57.844	21	14339 23:09	4.50

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
1	0.23	3.25	30.49	69.317
2	0.22	7.42	70.55	157.148
3	0.19	3.04	28.74	53.890
System	0.21	13.71	129.78	280.355

****
Link Flow Summary
****

	Maximum	Time of Max	Maximum	Max/	Max/

Link	Type	Flow| CFS	Occurrence days	Occurrence hr:min	Veloc| ft/sec	Full Flow	Full Depth
8	DUMMY	28.74	10721	20:00			
9	DUMMY	70.55	10721	20:00			
10	DUMMY	30.49	10721	20:00			
D-DivA-OF	DUMMY	30.49	10721	20:00			
D-DivA-TR	DUMMY	4.66	110	13:09			
D-DivB-OF	DUMMY	70.55	10721	20:00			
D-DivB-TR	DUMMY	15.00	110	16:10			
D-DivC-OF	DUMMY	28.74	10721	20:00			
D-DivC-TR	DUMMY	4.50	110	13:58			
1	WEIR	2.96	13237	09:08			0.00
2	WEIR	12.27	9597	13:09			0.00
3	WEIR	3.42	14339	23:09			0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Oct 24 08:57:50 2017
Analysis ended on: Tue Oct 24 08:59:17 2017
Total elapsed time: 00:01:27

```
[TITLE]

[OPTIONS]
FLOW_UNITS              CFS
INFILTRATION            GREEN_AMPT
FLOW_ROUTING            KINWAVE
START_DATE              10/01/1968
START_TIME              00:00:00
REPORT_START_DATE       10/01/1968
REPORT_START_TIME       00:00:00
END_DATE                10/01/2008
END_TIME                06:00:00
SWEEP_START             01/01
SWEEP_END               12/31
DRY_DAYS                0
REPORT_STEP             00:10:00
WET_STEP                00:15:00
DRY_STEP                04:00:00
ROUTING_STEP            0:00:30
ALLOW_PONDING           NO
INERTIAL_DAMPING        PARTIAL
VARIABLE_STEP           0.75
LENGTHENING_STEP        0
MIN_SURFAREA            0
NORMAL_FLOW_LIMITED     BOTH
SKIP_STEADY_STATE       NO
FORCE_MAIN_EQUATION     H-W
LINK_OFFSETS            DEPTH
MIN_SLOPE               0

[EVAPORATION]
;;Type           Parameters
;;-----------    ----------
MONTHLY          0.03    0.0479  0.0719  0.102   0.132   0.156   0.168   0.15    0.114   0.0781  0.042   0.03
DRY_ONLY     NO

[RAINGAGES]
;;               Rain            Time    Snow    Data
;;Name           Type            Intrvl  Catch   Source
;;-------------- ---------       ------  ------  ----------
Newhall          INTENSITY       1:00    1.0     FILE            "NEWHALL_PATCHED_20091119.NCD"   46162           IN

[SUBCATCHMENTS]
;;                                                Total   Pcnt.           Pcnt.   Curb    Snow
;;Name           Raingage        Outlet          Area    Imperv  Width   Slope   Length  Pack
;;-------------- --------------- --------------- ------- ------- ------- ------- ------- ----------
Category1        Newhall         FacilityA       1       100     174.2   5       0
Category2        Newhall         FacilityB       1       100     174.2   5       0
Category3        Newhall         FacilityC       1       100     174.2   5       0

[SUBAREAS]
;;Subcatchment   N-Imperv        N-Perv          S-Imperv        S-Perv          PctZero         RouteTo         PctRouted
;;-------------- ----------      ----------      ----------      ----------      ----------      ----------      ----------
Category1        0.012           0.25            0.02            0.06            25              OUTLET
Category2        0.012           0.25            0.02            0.06            25              OUTLET
Category3        0.012           0.25            0.02            0.06            25              OUTLET

[INFILTRATION]
;;Subcatchment   Suction         HydCon          IMDmax
;;-------------- ----------      ----------      ----------
Category1        8               0.275           0.32
Category2        8               0.275           0.32
Category3        8               0.275           0.32

[JUNCTIONS]
;;               Invert          Max.            Init.           Surcharge       Ponded
;;Name           Elev.           Depth           Depth           Depth           Area
;;-------------- ----------      ----------      ----------      ----------      ----------
Cat2Weir         0               0               0               0               0
Cat3Weir         0               0               0               0               0
Cat1Weir         0               0               0               0               0

[OUTFALLS]
;;               Invert          Outfall         Stage/Table     Tide
;;Name           Elev.           Type            Time Series     Gate
```

A 1-acre unit area was modeled with 100% imperviousness and soil parameters consistent with Regional Facility model.

Catchment is 100% impervious; therefore, no sensitivity to soil parameters.

```
;;--------------  ----------      ----------      ----------------  ----
1               0               FREE                              NO
2               0               FREE                              NO
3               0               FREE                              NO

[STORAGE]
;;              Invert  Max.    Init.   Storage         Curve                   Ponded  Evap.
;;Name          Elev.   Depth   Depth   Curve           Params                  Area    Frac.   Infiltration Parameters
;;--------------  ------  ------  ------  ----------      ----------------------  ------  ------  ----------  ----------  ----------
FacilityA       100     18      0       TABULAR         FacilityA               0       0       .01     1.3     .01
FacilityB       100     18      0       TABULAR         FacilityB               0       0       .01     .15     .01
FacilityC       100     18      0       TABULAR         FacilityC               0       0

[CONDUITS]
;;              Inlet           Outlet                          Manning         Inlet           Outlet          Init.
        Max.
;;Name          Node            Node            Length          N               Offset          Offset          Flow
        Flow
;;--------------  ----------------  ----------------  ----------      ----------      ----------      ----------      ----------
        ----------
4               Cat2Weir        2               10              0.01            0               0               0
        0
5               Cat3Weir        3               10              0.01            0               0               0
        0
6               Cat1Weir        1               10              0.01            0               0               0
        0

[WEIRS]
;;              Inlet           Outlet          Weir            Crest           Disch.          Flap    End     End
;;Name          Node            Node            Type            Height          Coeff.          Gate    Con.    Coeff.
;;--------------  ----------------  ----------------  ------------    ----------      ----------      ----    ----------
1               FacilityA       Cat1Weir        TRANSVERSE      2               3.33            NO      0       0
2               FacilityB       Cat2Weir        TRANSVERSE      2.1             3.33            NO      0       0
3               FacilityC       Cat3Weir        TRANSVERSE      1.5             3.33            NO      0       0

[OUTLETS]
;;              Inlet           Outlet          Outflow         Outlet          Qcoeff/                         Flap
;;Name          Node            Node            Height          Type            QTable          Qexpon          Gate
;;--------------  ----------------  ----------------  ----------      ----------------  ----------------  ----------      ----
Cat2Underdrain  FacilityB       2               .6              TABULAR/HEAD    2Underdrain                     NO
Cat3Underdrain  FacilityC       3               0               TABULAR/HEAD    3Underdrain                     NO

[XSECTIONS]
;;Link          Shape           Geom1           Geom2           Geom3           Geom4           Barrels
;;--------------  ------------    ----------------  ----------      ----------      ----------      ----------
4               DUMMY           0               0               0               0               1
5               DUMMY           0               0               0               0               1
6               DUMMY           0               0               0               0               1
1               RECT_OPEN       16              10              0               0
2               RECT_OPEN       16              10              0               0
3               RECT_OPEN       16              10              0               0

[LOSSES]
;;Link          Inlet           Outlet          Average         Flap Gate
;;--------------  ----------      ----------      ----------      ----------

[CURVES]
;;Name          Type            X-Value         Y-Value
;;--------------  ----------      ----------      ----------
2Underdrain     Rating          0               0
2Underdrain                     .01             .2
2Underdrain                     18              .2

3Underdrain     Rating          0               0
3Underdrain                     .01             .27
3Underdrain                     18              .27

FacilityA       Storage         0               1781
FacilityA                       18              1781

FacilityB       Storage         0               1696
FacilityB                       18              1696

FacilityC       Storage         0               2374
FacilityC                       18              2374
```

Infiltration rate for Category 1 set to yield 21-hour drawdown.

Weir crest height establishes the max WQ depth of each BMP Category; depth below overflow consists of effective storage depth in ponding and gravel pores

Underdrain rating curves developed for 5 in/hr media filtration rate.
Category 2 example:
Q(cfs) = (1/12)*(1/3600)*(5)*surface area
= (1/12)*(1/3600)*5*1696
= 0.20 cfs

```
[REPORT]
INPUT           NO
CONTROLS        NO
SUBCATCHMENTS   ALL
NODES   ALL
LINKS   ALL

[TAGS]

[MAP]
DIMENSIONS      0.000   0.000   10000.000       10000.000
Units           None

[COORDINATES]
;;Node          X-Coord                 Y-Coord
;;--------------------------------------------------------
Cat2Weir        3738.602                2750.760
Cat3Weir        6762.918                2720.365
Cat1Weir        1124.620                2462.006
1               993.151                 2000.000
2               3773.973                1931.507
3               6787.671                1958.904
FacilityA       979.452                 3712.329
FacilityB       3760.274                3589.041
FacilityC       6732.877                3479.452

[VERTICES]
;;Link          X-Coord                 Y-Coord
;;--------------------------------------------------------
Cat2Underdrain  4620.061                2963.526
Cat3Underdrain  7887.538                3161.094

[Polygons]
;;Subcatchment  X-Coord                 Y-Coord
;;--------------------------------------------------------
Category1       308.219                 7410.959
Category2       3267.123                7410.959
Category3       6404.110                7342.466

[SYMBOLS]
;;Gage          X-Coord                 Y-Coord
;;--------------------------------------------------------
Newhall         2806.122                8992.347
```

Representative Parcel-based, Stand-alone BMPs

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
--------------------------------------------------------------

***********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
***********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ OCT-01-1968 00:00:00
Ending Date .............. OCT-01-2008 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:10:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 30.00 sec


WARNING 04: minimum elevation drop used for Conduit 4
WARNING 04: minimum elevation drop used for Conduit 5
WARNING 04: minimum elevation drop used for Conduit 6

*********************
Rainfall File Summary
*********************
Station    First        Last         Recording   Periods    Periods    Periods
ID         Date         Date         Frequency  w/Precip    Missing    Malfunc.
-------------------------------------------------------------------------------
46162      OCT-02-1968  DEC-25-2008     60 min      5324          0          0


*************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
*************************     ---------       -------
Total Precipitation ......       183.282       733.130
Evaporation Loss .........         8.056        32.224
Infiltration Loss ........         0.000         0.000
Surface Runoff ...........       177.318       709.270
Final Surface Storage ....         0.000         0.000
Continuity Error (%) .....        -1.141


*************************        Volume         Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......       177.318        57.782
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........       113.375        36.945
Internal Outflow .........         0.000         0.000
Storage Losses ...........        63.939        20.836
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.002


*******************************
Highest Flow Instability Indexes
```

Three unit-area models were set up to demonstrate that when a BMP is sized per the SWQDv, at least 80% capture is achieved. The three models are as described in Attachment A.

```
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00


**************************
Subcatchment Runoff Summary
**************************

---------------------------------------------------------------------------------------------------
                         Total      Total      Total      Total      Total       Total     Peak  Runoff
                        Precip      Runon       Evap      Infil     Runoff      Runoff   Runoff   Coeff
Subcatchment                in         in         in         in         in    10^6 gal      CFS
---------------------------------------------------------------------------------------------------
Category1               733.13       0.00      32.22       0.00     709.27       19.26     1.44   0.967
Category2               733.13       0.00      32.22       0.00     709.27       19.26     1.44   0.967
Category3               733.13       0.00      32.22       0.00     709.27       19.26     1.44   0.967


******************
Node Depth Summary
******************

-----------------------------------------------------------------
                            Average  Maximum  Maximum  Time of Max
                              Depth    Depth      HGL   Occurrence
Node                 Type      Feet     Feet     Feet  days hr:min
-----------------------------------------------------------------
Cat2Weir             JUNCTION  0.00     0.00     0.00     0  00:00
Cat3Weir             JUNCTION  0.00     0.00     0.00     0  00:00
Cat1Weir             JUNCTION  0.00     0.00     0.00     0  00:00
1                    OUTFALL   0.00     0.00     0.00     0  00:00
2                    OUTFALL   0.00     0.00     0.00     0  00:00
3                    OUTFALL   0.00     0.00     0.00     0  00:00
FacilityA            STORAGE   0.02     2.12   102.12  10721  19:19
FacilityB            STORAGE   0.03     2.21   102.21  10721  19:20
FacilityC            STORAGE   0.00     1.61   101.61  10721  20:00


******************
Node Inflow Summary
******************

-------------------------------------------------------------------------------
                            Maximum  Maximum                  Lateral       Total
                            Lateral    Total  Time of Max      Inflow      Inflow
                             Inflow   Inflow   Occurrence      Volume      Volume
Node                 Type       CFS      CFS  days hr:min    10^6 gal    10^6 gal
-------------------------------------------------------------------------------
Cat2Weir             JUNCTION  0.00     1.24  10721  19:20       0.000       0.732
Cat3Weir             JUNCTION  0.00     1.17  10721  20:00       0.000       0.240
Cat1Weir             JUNCTION  0.00     1.39  10721  19:19       0.000       3.860
1                    OUTFALL   0.00     1.39  10721  19:19       0.000       3.860
2                    OUTFALL   0.00     1.44  10721  19:20       0.000      13.823
3                    OUTFALL   0.00     1.44  10721  20:00       0.000      19.260
FacilityA            STORAGE   1.44     1.44  10721  19:30      19.259      19.259
FacilityB            STORAGE   1.44     1.44  10721  19:30      19.259      19.259
FacilityC            STORAGE   1.44     1.44  10721  19:30      19.259      19.259


**********************
Node Surcharge Summary
**********************

No nodes were surcharged.
```

Total Bypass

Total Inflow

Example calculation - Category 1
% Capture = 1-(Total Bypass/Total Inflow)
= 1-(3.86/19.259)
= 80.0%

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
FacilityA	0.042	0	80	3.776	12	10721 19:18	1.39
FacilityB	0.057	0	28	3.751	12	10721 19:19	1.44
FacilityC	0.003	0	0	3.816	9	10721 20:00	1.44

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS	Total Volume 10^6 gal
1	0.23	0.17	1.39	3.860
2	1.06	0.14	1.44	13.823
3	2.04	0.10	1.44	19.260
System	1.11	0.41	4.26	36.942

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
4	DUMMY	1.24	10721 19:20			
5	DUMMY	1.17	10721 20:00			
6	DUMMY	1.39	10721 19:19			
1	WEIR	1.39	10721 19:19			0.00
2	WEIR	1.24	10721 19:20			0.00
3	WEIR	1.17	10721 20:00			0.00
Cat2Underdrain	DUMMY	0.20	110 13:10			
Cat3Underdrain	DUMMY	0.27	110 13:15			

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
4	0.01	0.01	0.01	350646.01	0.01
5	0.01	0.01	0.01	350646.01	0.01
6	0.01	0.01	0.01	350646.01	0.01

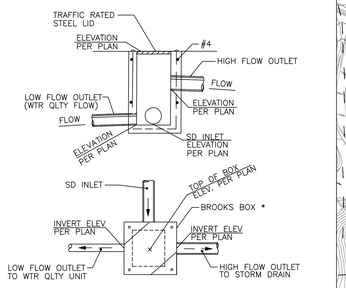
Analysis begun on: Tue Nov 12 09:29:37 2013
Analysis ended on: Tue Nov 12 09:31:12 2013
Total elapsed time: 00:01:35

ENTRADA-SOUTH

LID/WATER QUALITY MAINTENANCE MAP PLAN
PORTION OF TENTATIVE TRACT 53295

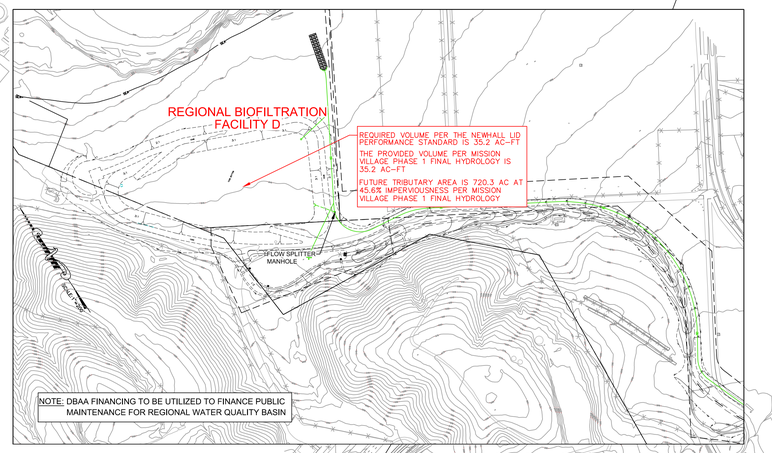
LEGEND

- BIO-RETENTION: - WHOLE AREA NEEDS TO BE SLOPE < 1%
  - MUST HAVE SUB-DRAIN
- PROPOSED STORM DRAIN
- DRAINAGE BASIN BOUNDARIES
- FLOW DIRECTION



* RECOMMENDED PROPRIETARY UNIT BY BROOKS PRODUCTS. KNOCKOUT SIZES, KNOCKOUT LOCATIONS, AND BOX DEPTHS ARE CUSTOMIZABLE PER CONTRACTORS NEEDS.

DIVERSION STRUCTURE DETAIL
NO SCALE



OFFSITE UNDEVELOPED-NORTH
AREA=55.7 AC

TO REGIONAL BIOFILTRATION FACILITY D

STORM DRAIN ACCESS ROAD

BASIN A TOTAL=748.3 AC

BASIN A2
AREA AC

THE SWQDv MUST BE PROVIDED FOR COMMERCIAL AND MULTI-FAMILY LOTS THAT DRAIN TO MISSION VILLAGE FACILITY D.

CALCULATED TOTAL REQUIRED LID VOLUME = 3.82 AC-FT FOR THE TOTAL AREA OF 39.6 ACRES OF MULTI-FAMILY AND COMMERCIAL THAT DRAINS TO MISSION VILLAGE FACILITY D.

PARCEL-BASED LID BMPS TO BE USED TO THE SATISFACTION OF LACDPW AND TO MEET THE REQUIREMENTS OF THE NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD. TO BE PRIVATELY MAINTAINED.

COMMERCIAL

BASIN E
AREA=29.2 AC
SWQDv = 92,783 CF
REQUIRED BMP VOLUME = 92,790 ft³
(OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)
BIO-FILTRATION SWQDv = 0.50 cfs Qpw=0.34 cfs V w =6,682.9 ft³
BIO-FILTRATION SWQDv = 0.59 cfs Qpw=0.44 cfs V w =8,816.2 ft³

BASIN I
AREA 0 AC

BASIN J
AREA 2 AC

BASIN L
AREA=3.7 AC
BIO-FILTRATION SWQDv = 0.72 cfs Qpw=0.47 cfs V w =9,400.6 ft³
BIO-FILTRATION SWQDv = 0.14 cfs Qpw=0.12 cfs V w =2,470.0 ft³

BASIN N
AREA AC

BASIN K
AREA 3 AC

BASIN H
AREA AC

BASIN D
AREA 0 AC
Qpw=1.91 cfs
V w =31,707.7 ft³
BIO-FILTRATION SWQDv = 0.59 cfs Qpw=0.31 cfs V w =5,105.5 ft³

BASIN F
AREA=9.1 AC
Qpw=1.89 cfs
V w =26,565.6 ft³

BASIN G
AREA 0 AC

BASIN Q
AREA 0 AC

BASIN B2
AREA AC
Qpw=1.66 cfs
V w =30,094 ft³

BASIN S
AREA=1.3 AC

BASIN C
AREA=2.0 AC
Qpw=0.19 cfs
V w =3,626.4 ft³

BASIN R
AREA 2 AC

BASIN W
AREA=1.7 AC
Qpw=0.05 cfs
V w =914.9 ft³

BASIN T
AREA 2 AC
BIO-FILTRATION DESIGN Qpw=0.53 cfs Qpw=0.39 cfs V w =6,885.9 ft³
BIO-FILTRATION DESIGN Qpw=0.35 cfs Qpw=0.29 cfs V w =3,813.7 ft³

BASIN P
AREA=16.2 AC
Qpw=3.50 cfs
V w =47,690.5 ft³

BASIN B1
AREA 0 AC
Qpw=4.63 cfs
V w =99,086 ft³

BASIN B3
AREA 2 AC
Qpw=0.95 cfs
V w =16,423 ft³

BASIN U
AREA=1.4 AC

BASIN V
AREA 2 AC

BASIN BB
AREA=1.4 AC

BASIN AA
AREA=0.9 AC

BASIN Y
AREA=3.0 AC
SWQDv =9,583.2 CF
REQUIRED LID VOLUME = 9,590 ft³
(OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)

BASIN X
AREA=10.2 AC
SWQDv =32,234.4 CF
REQUIRED BMP VOLUME = 32,240 ft³
(OR EQUIVALENT TREATMENT SEE NOTES 1,2, AND 3)

INFILTRATION BASIN "A"
TREATS BASIN: C, D, T, R, & S
3.00 ft. DEEP X 24,413 ft² =
73,238 ft³ TREATMENT VOLUME
A=25.3 AC
Qpw=4.66 cfs
V w =70,155 ft³

INFILTRATION BASIN "B"
TREATS BASIN: B1, P, & W
3.75 ft. DEEP X 39,374 ft² =
147,654 ft³ TREATMENT VOLUME
A=62.9 AC
Qpw=15.00 cfs
V w =147,601 ft³

INFILTRATION BASIN "C"
TREATS BASIN: B2, B3, & Q
3.50 ft. DEEP X 15,515 ft² =
54,303 ft³ TREATMENT VOLUME
A=24.7 AC
Qpw=4.50 cfs
V w =49,606 ft³

BASIN EE
AREA=0.7 AC
BIO-FILTRATION SWQDv = 0.13 cfs Qpw=0.09 cfs V w =1,725.1 ft³
BIO-FILTRATION SWQDv = 0.77 cfs Qpw=0.33 cfs V w =6,498.6 ft³

BASIN DD
AREA 0 AC
BIO-FILTRATION SWQDv = 0.15 cfs Qpw=0.10 cfs V w =1,963.9 ft³
BIO-FILTRATION SWQDv = 0.56 cfs Qpw=0.43 cfs V w =8,575.5 ft³
BIO-FILTRATION SWQDv = 0.18 cfs Qpw=0.12 cfs V w =2,371.6 ft³

BASIN CC
AREA AC
BIO-FILTRATION SWQDv = 0.75 cfs Qpw=0.50 cfs V w =9,881.5 ft³

BIO-FILTRATION SWQDv = 0.34 cfs Qpw=0.23 cfs V w =4,468.7 ft³
BIO-FILTRATION SWQDv = 0.35 cfs Qpw=0.23 cfs V w =4,595.6 ft³
BIO-FILTRATION SWQDv = 0.23 cfs Qpw=0.15 cfs V w =3,021.1 ft³
BIO-FILTRATION SWQDv = 0.28 cfs Qpw=0.18 cfs V w =3,671.6 ft³

PARCEL-BASED LID BMPS TO BE USED TO THE SATISFACTION OF LACDPW AND TO MEET THE REQUIREMENTS OF THE NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD. TO BE PRIVATELY MAINTAINED.

PARCEL-BASED LID BMPS TO BE USED TO THE SATISFACTION OF LACDPW AND TO MEET THE REQUIREMENTS OF THE NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD. TO BE PRIVATELY MAINTAINED.

PARCEL-BASED LID BMP TREATMENT NOTES

1. LID BMPS TO BE DESIGNED AND PLACED WITHIN THE BASIN WITH FINAL IMPROVEMENT PLANS TO THE SATISFACTION OF LACDPW AND TO MEET THE REQUIREMENTS OF THE NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD.
2. LID BMPS SHALL BE SELECTED TO INFILTRATE THE SWQDv TO THE MAXIMUM EXTENT PRACTICABLE BASED ON PARCEL-LEVEL FEASIBILITY SCREENING. IF INFILTRATION IS NOT FULLY FEASIBLE, THE BMPS SHALL BE SELECTED TO INFILTRATE TO THE EXTENT FEASIBLE AND BIOFILTER THE REMAINING VOLUME NOT RELIABLY RETAINED AT A RATE OF 1.5 TO 1.0. BMP SELECTION SHALL BE PER THE NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD.

T.M. 61105

VTTM 61105
MISSION VILLAGE
NOT A PART
(SAME OWNER)

CONDOMINIUM SITE

SINGLE FAMILY HOMES

MULTI-FAMILY SITE

SCHOOL SITE

PARK SITE

ACCESS ROAD

OFFSITE UNDEVELOPED WEST
AREA = 602.5 AC

VTTM 61105
MISSION VILLAGE
NOT A PART
(SAME OWNER)

OFFSITE -SOUTH
AREA=28.7 AC

OFFSITE -SOUTH
AREA=13.4 AC

INTERSTATE

FREEWAY

SKYVIEW DRIVE

NOTE: DBAA FINANCING TO BE UTILIZED TO FINANCE MAINTENANCE FOR BIO-FILTRATIONS DEVICES AND INFILTRATION BASINS

NOTE: SWQDv ARE PER NEWHALL/ENTRADA SOUTH LID PERFORMANCE STANDARD. Qpm AND Vm ARE CALCULATED AS THE GREATER OF EITHER THE COUNTY OF LOS ANGELES LID CALCULATOR OR THE NEWHALL/ENTRADA SOUTH PERFORMANCE STANDARD.

SCALE: 1"=200'

FEET
200 100 0 200 400

INCHES
1 1/2 0 1 2

ALLIANCE
LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE.
CARLSBAD, CA 92008
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FAX: (760) 431-8802
27433 TOURNEY ROAD
SUITE 250
VALENCIA, CA 91355
TEL: (661) 799-2760
FAX: (661) 254-1929
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING

PLANS PREPARED BY:
ALLIANCE LAND PLANNING & ENGINEERING INC.
2248 FARADAY AVE. CARLSBAD, CA. 92008
(760) 431-9896

PLANS PREPARED UNDER THE DIRECTION OF:
CRAIG M. WHITTEKER R.C.E. 51929 — 10/24/17 DATE

REGISTERED PROFESSIONAL ENGINEER — CRAIG M. WHITTEKER — No. 51929 — 6-30-18 — CIVIL — STATE OF CALIFORNIA

PLANS PREPARED FOR:
NEWHALL LAND
23823 WEST VALENCIA BOULEVARD
VALENCIA, CALIFORNIA 91355
TELEPHONE: (661) 255-4000
REPRESENTATIVE : ALEX HERRELL

HYDROLOGY STUDY APPROVED
CHECKED BY: RCE NO. 82680 DATE 11/16/2017
APPROVED BY: DATE 11/16/2017
COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION

NO.	DATE	BY	APPR

1 | COUNTY OF LOS ANGELES | 1 SHEETS

LID/WATER QUALITY MAINTENANCE PLAN MAP FOR ENTRADA-SOUTH TENTATIVE TRACT 53295

PLAN PREPARATION DATE: 12/21/15

0930/HYDROLOGY/0930-WQMP.dwg

LID RUNOFF CALCULATIONS									
BASIN	AREA (AC)	PROPORTION IMPERVIOUS	SOIL TYPE	RAINFALL AMOUNT (in)	FLOW PATH LENGTH (ft)	FLOWPATH SLOPE	INTENSITY	24-HOUR RUNOFF VOLUME (cu. ft.)	FLOWRATE (CFS)
A	720.30	0.46	98	N/A	N/A	N/A	N/A	N/A	66.30
B1	45.00	0.57	98	1.1	2,930.00	0.04	0.19	99,086	4.63
B2	16.52	0.45	98	1.1	1,295.00	0.03	0.22	30,094	1.66
B3	7.15	0.60	98	1.1	1,400.00	0.03	0.20	16,423	0.95
C	2.02	0.05	98	1.1	260.00	0.20	0.34	1,182	0.18
D	10.82	0.80	98	1.1	1,700.00	0.04	0.24	31,708	1.91
E	29.20	0.91	98	1.1	2,000.00	0.03	0.23	95,956	4.85
F	9.06	0.80	98	1.1	840.00	0.02	0.28	26,566	1.89
G	0.63	0.89	98	1.1	780.00	0.05	0.32	2,026	0.10
H	1.10	0.78	98	1.1	710.00	0.05	0.31	3,146	0.16
I	2.31	0.79	98	1.1	1,410.00	0.01	0.23	6,683	0.34
J	2.68	0.91	98	1.1	1,330.00	0.01	0.24	8,816	0.44
K	2.37	0.69	98	1.1	1,420.00	0.04	0.24	6,106	0.31
L	3.71	0.67	98	1.1	1,380.00	0.04	0.24	9,401	0.47
M	4.01	0.39	98	1.1	1,240.00	0.01	0.20	6,499	0.33
N	1.11	0.57	98	1.1	360.00	0.03	0.34	2,470	0.12
O	3.33	0.69	98	1.1	900.00	0.12	0.25	8,575	0.43
P	16.23	0.80	98	1.1	760.00	0.02	0.29	47,601	3.50
Q	1.00	0.85	98	1.1	1,200.00	0.02	0.26	3,089	0.20
R	2.10	0.91	98	1.1	1,980.00	0.02	0.22	6,886	0.39
S	1.30	0.80	98	1.1	840.00	0.04	0.30	3,814	0.29
T	1.20	0.84	98	1.1	720.00	0.06	0.33	3,672	0.18
U	2.32	0.50	98	1.1	1,170.00	0.04	0.24	4,596	0.23
V	1.22	0.49	98	1.1	720.00	0.05	0.28	2,372	0.12
W	1.65	0.05	98	1.1	360.00	0.06	0.23	915	0.05
X	10.20	0.80	98	1.1	760.00	0.02	0.29	29,935	1.51
Y	2.95	0.88	98	1.1	700.00	0.02	0.30	9,352	0.47
Z	NOT USED								
AA	0.93	0.90	98	1.1	400.00	0.04	0.38	3,021	0.15
BB	1.36	0.91	98	1.1	1,170.00	0.04	0.28	4,469	0.23
CC	3.08	0.89	98	1.1	1,140.00	0.04	0.28	9,881	0.50
DD	0.61	0.89	98	1.1	380.00	0.01	0.36	1,964	0.10
EE	0.71	0.64	98	1.1	380.00	0.01	0.33	1,725	0.09

Entrada South – Evaluation of Conformance with Project LID Performance Standards

ETSU2022000056

Volume III

County of Los Angeles

Prepared for:

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DATED:
Nov, 2024

Entrada South Tentative Tract Map No. 53295

Evaluation of Conformance with Project LID Performance Standard

Geosyntec Consultants, November 2024

Limitations

The professional engineering seal affixed to this memorandum pertains specifically to the analysis presented in this memorandum. It does not pertain to the design of the storm drain system or the design of regional LID facilities. The analysis presented in this memorandum relies upon information provided by a third party. We have not independently confirmed the accuracy of this information.

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Memorandum

Date:	November 2024
To:	Alex Herrell, Five Point
	Jason Fukumitsu, Hunsaker and Associates
From:	Lisa Austin, Leon Li, Lindsey Spencer, and Aaron Poresky, Geosyntec Consultants
Subject:	Entrada South – Evaluation of Conformance with Project LID Performance Standard

1. INTRODUCTION

The Entrada South Project (Tentative Tract Map (TTM) No. 53295 (Project) includes low impact development (LID) best management practices (BMPs) as shown in the *Water Quality Exhibit for Entrada South* (Water Quality Exhibit, Hunsaker, 2024). The purpose of this memorandum is to verify that the LID BMPs proposed for the Project have been selected and sized in a manner consistent with the Project LID Performance Standard as defined by the Municipal Separate Storm Sewer System Discharges within the Coastal Watersheds of Los Angeles and Ventura Counties (MS4) Permit (Order No. R4-2021-0105) and the County of Los Angeles LID Standards Manual (LACDPW, 2014). The *Newhall Ranch Sub-Regional Stormwater Mitigation Plan* (NRSSMP) (Geosyntec, 2010) also serves as benchmarks for evaluating conformance.

The Project LID Performance Standard establishes three separate conformance metrics, including BMP selection, sizing of BMPs to provide adequate retention volume or equivalent biofiltration volume and sizing of BMPs to provide long-term storm water capture:

- **BMP selection.** LID BMPs have been selected in a manner consistent with the LID selection criteria (i.e., infiltration feasibility criteria) contained in the LID Performance Standard; and

- **LID design storm retention and biofiltration.** The proposed BMPs provide retention or equivalent biofiltration of the LID design storm consistent with the LID Performance Standard; and

- **BMP long-term capture.** The proposed BMPs provide capture and treatment of at least 80 percent of average annual runoff volume for each drainage area within the Project, consistent with the LID Performance Standard.

This memorandum demonstrates conformance with the first two conformance metrics (BMP selection and LID design storm retention and biofiltration). The Project's conformance to the 80 percent long-term capture metric is not documented in this memorandum as it is not a requirement of the MS4 Permit, or the LID Standards Manual and is not subject to review by LACDPW.

Because the proposed Project disturbs greater than one acre of area and adds more than 10,000 square feet of impervious surface area, this Project is categorized as a Designated Project according to LACDPW's LID Standards Manual (LACDPW, 2014). This memorandum also explains why the stormwater management requirements for designated projects are met or exceeded when the Project's LID Performance Standard is met.

Section 2 describes the applicable LID Performance Standards which are used to demonstrate Project conformance. Section 3 describes the Project's water quality project design features (PDFs). Section 4 demonstrates conformance of the water quality PDFs to each of the conformance metrics identified above.

A list of figures and attachments are appended to the end of this memorandum, including:

Figure 1: Entrada South Land Use
Figure 2: Entrada South Drainage Areas and Treatment Categories
Attachment A: Entrada South Low Impact Development Exhibit
Attachment B: Modeling Methodology in Support of LID Conformance Analysis
Attachment C: Model Files

2. LID PERFORMANCE STANDARD

The Project LID Performance Standard described in this section complies with the provisions of the 2021 MS4 Permit, and the LID Standards Manual. As benchmarks, the LID Performance Standard is also consistent with the Newhall Ranch Sub-Regional Stormwater Mitigation Plan (NRSSMP) (Geosyntec, 2010). The LID Performance Standard applies to all developed areas within the Project.

The Project LID Performance Standard is based primarily on Section F.1.d and F.4 of the 2021 MS4 Permit. The Newhall NRSSMP influence the manner in which BMP strategies are applied and result in more stringent criteria in some respects. These additional benchmarks do not reduce the requirement to comply with Section F.1.d and F.4 of the 2021 MS4 Permit. The LID Performance Standard would be implemented as follows:

- Based on an assessment of feasibility[1], one of four BMP strategies shall be applied as follows. BMPs may be applied at the scale of individual parcels or at the scale of regional facilities treating multiple parcels.

  a. If it is feasible to infiltrate all of the runoff produced from the 1.1 inch storm event[2] (LID Design Volume) from the developed area (i.e., soil infiltration rates are at least 0.3 inches per hour, and no other technical infeasibility concerns exist), on-site infiltration BMPs [Category 1] shall be used. Harvest and reuse are not applicable to projects in the NRSSMP because non-potable water demands will be met with recycled water and there is no additional demand for harvested stormwater based on an assessment of harvest and reuse feasibility conducted as part of the overall NRSSMP (Geosyntec, 2010).

  b. If it has been demonstrated in the Project WQTR and Drainage Concept Report that the BMP strategy of subsection (a), of this condition is infeasible, and if the project has low soil infiltration rates (i.e., the soil infiltration rate is less than 0.3 inches per hour), but no other technical infeasibility concerns exist, bioinfiltration BMPs [Category 2] shall be used. Bioinfiltration facilities are similar to bioretention facilities with an underdrain, but they include storage below the underdrain to maximize the volume infiltrated. These facilities shall retain a portion of the runoff from the 1.1 inch design storm, then biofilter 1.5 times the remaining runoff from the 1.1 inch design storm.

  c. If it has been demonstrated in the Project WQTR and Drainage Concept Report that the BMP strategies of subsections (a) and (b) above are infeasible, then biofiltration BMPs [Category 3] shall be used. These BMPs shall biofilter the runoff produced from the 1.5 times the 1.1 inch design storm.

  d. If it has been demonstrated in the Project WQTR and Drainage Concept Report that the BMP strategies of subsections (a), (b) and (c) above are infeasible and this demonstration is accepted by the Los Angeles Regional Water Quality Control Board Executive Officer, then flow-based treatment control BMPs shall be used to filter or treat runoff. These BMPs must be sized and designed to: (1) filter or treat the maximum flow rate of runoff produced from a rainfall intensity of 0.3 inch of rainfall for each hour of a storm event and (2) be certified for "Enhanced Treatment" under the

[1] Feasibility shall be assessed per Section F.4.b.ii.
[2] The 85th percentile, 24-hour storm depth is equal to 1.1 inches as determined from the Los Angeles County 85th Percentile 24-hr Rainfall Isohyetal Map (February 2004).

Washington State Department of Ecology's TAPE Program or an appropriate future BMP certification developed by the State of California.

- The BMPs shall also be demonstrated to provide treatment for at least 80 percent capture and treatment of the average annual runoff volume for the tributary area. This sizing criteria was established to be consistent with Newhall NRSSMP but not required by the MS4 Permit or the LID Standards Manual. While this standard continues to apply to the sizing of LID features, conformance to this requirement is not documented in this memorandum..

- Pretreatment must be provided for stormwater BMPs whose function may be adversely affected by sediment or other pollutants, as specified in Section 7.2 of the LID Manual (LACDPW, 2014).

The same standards shall apply to parcel-based, right-of-way, regional LID facilities. Demonstration of conformance to these standards shall be based on the overall system of BMPs proposed for the Project. This may include combinations of BMPs at multiple scales, collectively demonstrating conformance to this standard.

3. PROPOSED WATER QUALITY PROJECT DESIGN FEATURES

The sections below describe the LID BMPs that are proposed as part of the Project and demonstrate that these BMPs conform to the BMP selection and LID design storm retention and biofiltration requirement in the Project LID Performance Standard. These BMPs are also illustrated in Attachment A (LID Exhibit) of this memorandum.

3.1 Regional LID Facilities

There are two regional LID facilities proposed within the Project. Regional Facility B is proposed as an infiltration facility (Category 1), and Regional Facility C is proposed as a bioinfiltration facility (Category 2). Selection of the type of facilities is based on feasibility screening results (Engeo, 2021). These facilities are designed to treat runoff from much of their respective watersheds, with the exception of open space bypassing treatment (which does not require treatment). The detailed designs of regional LID facilities will be developed at a later time and will be developed to be consistent with design and maintenance standards acceptable to LACDPW.

Runoff from subwatersheds in the western portion of the Project are proposed to be directed to Mission Village Regional Facility D (See Figure 2), which is sized for its ultimate conditions in which it will accept runoff from Mission Village, Entrada South, and portions of the existing Westridge community. Mission Village Facility D was described and analyzed as part of the Mission Village Phase I Final Hydrology Study and associated conformance memorandum (Geosyntec, 2019). It is reanalyzed in this memorandum to account for the current proposed land

uses and drainage boundaries in Entrada South to demonstrate that Basin D continues to meet LID Performance Standards. Regional facilities will be maintained by LACDPW and funded through a Community Facilities District (CFD).

The regional facilities proposed to provide stormwater treatment for the Project are similar to bioretention LIDs and biofiltration LIDs with underdrain as described in the LID Standards Manual (LACDPW, 2014) with the exception that maximum ponding depths are somewhat deeper, drainage areas are somewhat larger, and resulting footprints are larger. These basins will incorporate several design enhancements to maintain performance and enable O&M for facilities constructed at a larger scale, including:

- Pre-treatment systems will remove sediment. Additionally, open space areas will be bypassed in separate conveyance systems. Both approaches reduce sediment loading to the media bed and support deeper ponding depths without elevated risk of clogging.

- Enhanced energy dissipation and flow distribution will be provided reduce the risk of surface erosion and spread water through the facility, offsetting the effect of larger basin footprints.

- Outlet structures will have hydraulic controls that limit the maximum rate of flow through the media and underdrains, helping to ensure that water spreads over the full footprint of the facility and does not short-circuit.

- Media will have a higher permeability than standard media (combined with outlet control to reduce the actual filtration rate), improving the resistance to clogging.

- Facilities will have an enhanced gravel storage layer below underdrain discharge elevation to retain pollutants and support incidental infiltration, where feasible.

- O&M access will be provided via access ramps and other features consistent with approaches used for extended detention and flow control basins.

- O&M protocols will be detailed for these facilities as part of an O&M manual; these protocols will account for the larger footprint and ponding depth.

- The facilities will continue to meet LID Standards Manual criteria for media flowrate and drawdown time. Treatment performance and plant health should not be affected by the scale of the facilities.

- During most storms, ponding will not exceed 18 inches of depth; larger storms may exceed this depth for very short periods (1-3 hours).

- Access to facilities will be restricted to avoid safety hazards associated with ponding depths that temporarily exceed 18 inches.

Based on these design adaptations, these regional facilities are functionally equivalent to bioretention LIDs and biofiltration LIDs with underdrain as described in the LID Standards Manual (LACDPW, 2014) and fully conform to the applicable LID design requirement outlined in the LID Standards Manual (BMP selection, sizing, drawdown time, media filtration rate and pretreatment) as demonstrated in Section 4 of this memorandum.

3.2 Right-of-Way LID BMPs

For two segments of connecting streets ("A Street" and "B Street") to Magic Mountain Parkway (MMP), stand-alone right-of-way (ROW) LID BMPs within the public roadways will be used to meet the full requirements of the LID Performance Standard. Two dedicated areas next to the street segments along MMP as shown on Attachment A are proposed as biofiltration basins to provide treatment for the street runoff. The design of the basins include a sedimentation forebay as pretreatment device. The sediment forebays capture sediment, trash, and debris and increase the longevity of the downstream BMPs. Inclusion of pretreatment for BMPs is consistent with the Standards Manual (LACDPW, 2014). Preliminary design of the biofiltration basins are provided in Attachment A and the detailed designs of the ROW LID facilities will be developed at a later time and will be developed to be consistent with design and maintenance standards acceptable to LACDPW.

These ROW LID features will be maintained by LACDPW funded via Community Facilities District (CFD)

3.3 Parcel-based LID BMPs

Parcel-based LID BMPs will be implemented as part of final parcel improvements for the commercial parcels located in Planning Areas (PAs) 1, 2, 3, and 14 in the Project area. These parcels are categorized as "Parcel-Based LID Treatment" in Figure 2.

Parcel-based LID BMPs will be implemented as part of final parcel improvements. Parcel-based LID BMPs applicable for these parcels include infiltration (Category 1), bioinfiltration (Category 2), and biofiltration (Category 3), which will ultimately be selected based on a parcel-scale assessment of infiltration feasibility, as described in the LID Performance Standard (Section 2.1). Factors considered in selection and placement of parcel-based LID BMPs as part of final parcel improvement plans shall include soil infiltration rates, geotechnical risks, setbacks from structures, slopes, and utility alignments, depth to groundwater, programmed density/uses of the parcel, and other factors deemed relevant as part of LACDPW review of final parcel improvement plans.

Areas that are suitable for infiltration shall be considered as part of site design and BMP placement within parcels.

Infiltration BMPs include bioretention without an underdrain (RET-1[3]), infiltration basins (RET-2[3]) or trenches (RET-3[3]), permeable pavement (RET-5[3]), or an equivalent infiltration BMP. Bioinfiltration and biofiltration BMPs are associated with BMP type BIO-1 under the LID Standards Manual. The design and maintenance of these parcel-based BMPs shall be consistent with the specifications detailed on the LID Standards Manual for the respective BMP type proposed for the Project (LACDPW, 2014).

Parcel-based BMPs will be designed to: 1) capture the LID design volume (as calculated per the LACDPW HydroCalc program for the 1.1-inch storm event), (2) infiltrate to the maximum extent feasible based on parcel-specific infiltration feasibility, and (3) biofilter 1.5 times the remaining runoff that cannot be feasibly infiltrated from the 1.1-inch design storm. By meeting these criteria, these facilities meet the BMP selection and LID design storm retention and biofiltration requirements of the LID Performance Standard. Alternative sizing and design configurations that meet the LID Performance Standard may be developed. In either case, conformance shall be documented as part of final parcel improvement plans.

Appropriate pretreatment, such as forebays, vegetated swales and filter strips will be designed as part of final parcel improvements and installed upstream of the parcel-based BMPs. These pretreatment devices captures sediment, trash, and debris and increases the longevity of the downstream BMPs. Inclusion of pretreatment for BMPs is consistent with the LID Standards Manual (LACDPW, 2014)

Parcel-based LIDs will be maintained by private parcel owner via property owner association or home owner association.

4. CONFORMANCE TO APPLICABLE LID PERFORMANCE STANDARD

This section summarizes the conformance of the proposed LID design features to each element of the Project LID Performance Standard that is subject to review by LACDPW.

4.1 BMP Selection

The Project LID Performance Standard requires that LID BMPs be selected based on an analysis of infiltration feasibility. A preliminary infiltration feasibility report for the Project (ENGEO,

[3] Equivalent BMP Type on the LID Standards Manual (LACDPW, 2014)

2021) [4]was approved by LACDPW Geotechnical and Materials Engineering Division in October 2022 and used as basis of BMP selection. The following paragraphs describe how the Project conforms to these requirements.

4.1.1 Regional LID Facilities

The Project LID Performance Standard requires that LID BMPs be selected based on an analysis of infiltration feasibility.

> **Regional Facility B.** Infiltration feasibility screening (Engeo, 2021) was based on results from site-specific infiltration feasibility investigations of Regional Facility B. Regional Facility B is underlain by young alluvial deposits, which has an average corrected infiltration rate of 3 inches per hour. Furthermore, groundwater was not encountered during the geotechnical investigations. Based on these findings, Facility B is proposed as an infiltration facility (Category 1), which is consistent with the preferred hierarchy for BMP selection.
>
> **Regional Facility C.** Based on feasibility screening (Engeo, 2021), Regional Facility C is underlain by young alluvial soil or Saugus Formation bedrock. While the infiltration rate of young alluvial deposits supports the selection of an infiltration facility (Category 1), it is unlikely that the underlying Saugus Formation will yield corrected infiltration rates equal or greater than 0.3 inches per hour. As the Saugus Formation is the limiting layer, this condition supports the selection of a bioinfiltration facility (Category 2). Furthermore, groundwater was not encountered during site investigations in this area, which also meets the criteria of either a Category 1 or a Category 2 facility. Based on these findings, Facility C is proposed as a bioinfiltration facility (Category 2).
>
> **Regional Facility D (Mission Village).** The basis for selection of Regional Facility D is provided in the Mission Village Phase 1, 2, 5 & 6 Water Quality Plan (Regional Facilities B, C and D) – Evaluation of Conformance with Newhall LID Performance Standard (Geosyntec Consultants, 2019). This is a biofiltration facility (Category 3).

Each of the regional facilities has been selected based on an analysis of infiltration feasibility. Therefore, this aspect of the performance standard is met.

[4] Plan Case Number ESTU2022000058

4.1.2 Right-of-Way LID BMPs

For the two segments of connecting streets ("A Street" and "B Street") to Magic Mountain Parkway (Figure 2), infiltration feasibility screening (Engeo, 2021) indicated that the ROW areas consists of certified engineered fill and Category 2 facilities were recommended due to the highly variable infiltration rates of the engineered fill material. However, due to the street segments' proximity to the graded slopes next to the existing Magic Mountain Parkway, Category 1 and 2 BMPs are not recommended. Therefore, biofiltration basins (Category 3) were proposed to treat the runoff from these two street segments, which is consistent with the LID performance standard.

4.1.3 Parcel-based LID BMPs

For areas identified as treated by parcel-based and ROW BMPs (Figure 2), LID BMPs shall be selected per the feasibility hierarchy described in Section 2.1 as part of final parcel improvement plans to the satisfaction of LACDPW. Conformance shall be demonstrated as part of final parcel improvement plans. Additionally, the final selection of BMP categories will be informed by a parcel-scale assessment of infiltration feasibility to meet the BMP selection hierarchy of the LID Performance Standard. Therefore, the proposed application of parcel-based and ROW LID BMPs conforms to the BMP selection requirements of the LID Performance Standard.

4.2 BMP Sizing to Achieve Retention or Equivalent Biofiltration of the 85th Percentile, 24-hour Storm Event

4.2.1 Regional Facilities

The LID Performance Standard requires that project design features be selected and sized to retain the volume of stormwater runoff produced from a 1.1-inch storm event (i.e., the LID Design Volume) for the Project site. Where it has been demonstrated that 100 percent of the LID Design Volume cannot be feasibly infiltrated, biofiltration shall be provided for 1.5 times the portion of the LID Design Volume that is not retained. For the purpose of demonstrating conformance, this standard has been applied for each regional LID facility.

To demonstrate that each regional facility meets this standard, the LID design storm runoff time series were calculated using HydroCalc for tributary area to each regional facility and subsequently used as input inflow times series to storage units representing the detailed hydraulic characteristics of the proposed regional facilities (stage-storage, infiltration, filtration and overflow) in an EPA SWMM model. The SWMM model inputs and outputs are provided in Attachment C.

Table 1: Catchment Parameters and Provided Size of Regional Facilities

BMP ID	Tributary Area (Acres)[1,2]	Flow Path Length (feet)	Flow Path Slope (vft/hft)	Soil Type	Impervious Percentage of Catchment[1]	Total Facility Volume Provided (ac-ft)[3]
Facility B	70.9	250	0.05	98	62%	4.53
Facility C	16.1			98	68%	0.79
Facility D[4,5]	329.4			98	62%	21.6

[1] Imperviousness based on area-weighted average of land use-specific imperviousness values from LA County Hydrology Manual; calculated for purposes of water quality analysis (Attachment B).
[2] HydroCalc program has a default drainage area size limit of 40 acres. However, in this case, the use of larger drainage areas is conservative. Drainage area size does not influence runoff volume; it only has an effect on peak flow. For this purpose, we are primarily using HydroCalc to size volumetric BMPs, so the timing of peaks is unimportant. Secondarily, we are using HydroCalc to determine the required water quality diversion flowrate. Having several smaller drainage areas will tend to reduce peak flows compared to one larger drainage area as there will be variability in time of concentration and offsetting of the peaks. Therefore, for the purpose of sizing diversion structures, a single larger drainage area with a short path length and steep slope produces a conservatively high required diversion flowrate compared to if smaller drainage areas were modeled.
[3] Total facility volume includes pore volume in gravel and media, as well as ponded volume above the media surface.
[4] Regional Facility D analysis includes the tributary areas draining to the facility in the final built-out condition, detailed in Table 2.
[5] Facility D was modeled as designed per the Mission Village project.

Regional Facility D was modeled based on the ultimate proposed condition of its drainage area, as described in the memorandum: "Mission Village Phase 1, 2, 5 & 6 Water Quality Plan (Regional Facilities B, C and D) – Evaluation of Conformance with Newhall LID Performance Standard" (Geosyntec Consultants, 2019). The drainage area from Entrada South and the imperviousness in Mission Village tributary area changed somewhat since the Mission Village memorandum; the current proposed Entrada South drainage area was modeled to demonstrate that Regional Facility D is adequately sized. The currently proposed Entrada South drainage area to Facility D is documented in this memorandum and the remaining tributary area to Facility D are summarized in Table 2 summarizes the volume within Regional Facility D that is allocated to each project that it is designed to treat.

Table 2: Regional Facility D – Volume Allocations by Project Comparison

Model Scenario	Project Location	Tributary Area (Acres)	Impervious Fraction of Catchment (%)	Facility Volume Allocated to Tributary Project (ac-ft)[1]
Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum	Mission Village	115.0	66.6	8.8
	Entrada South	121.5	52.3	7.3
	Existing Westridge	95.6	49.1	5.4
	Total	**332.1**	**56.3**	**21.6**
Entrada South Conformance Memorandum	Mission Village	115.0	68.6	8.4
	Entrada South	118.8	64.7	8.2
	Existing Westridge	95.6	49.1	5.0
	Total	**329.4**	**61.5**	**21.6**

[1]Volume allocated to each project were calculated by multiplying the total volume of the Facility by the ratio between impervious areas in each project and the total impervious areas of the entire tributary areas to Regional Facility D.

The regional facilities will be off-line. Water will be diverted to these basins from diversion structures and/or flow-splitting inlets. The required minimum diversion flowrates to each facility were determined using HydroCalc for the 1.1-inch storm event. Basins C and D include biofiltration; therefore, the diversion was sized for 1.5 times the peak of the 1.1-inch storm. Basin B is an infiltration facility; therefore, the diversion rate was based on the peak flow of the 1.1-inch storm without the use of a multiplier. Table 3 shows the required diversion flowrates and the detailed HydroCalc inputs and outputs are provided in Appendix B.

Table 3: Required Diversion Flowrates to Regional Facilities

BMP ID	Required Minimum Diversion Structure Flowrate, cfs[2]
Facility B	20.3
Facility C	7.7
Entrada South to Facility D[1]	40.3

[1] This diversion flowrate applies only to the area from Entrada South draining to Mission Village Basin D. Water will be split between water quality flows and high flows before it enters the Mission Village drainage system.
[2] Diversion structures will be included in Final Hydrology.

Hydrographs were generated using the LACDPW HydroCalc program for the subwatersheds tributary to each regional LID facility. Because Facilities C and D include biofiltration, the

resulting hydrographs were multiplied by 1.5, consistent with the LID Performance Standard, to produce an "upsized" hydrograph appropriate for biofiltration sizing. The model was run for the duration of the LID design storm event. Table 4 summarizes the portion of the event that was treated and the maximum volume and ponding depth of the regional LID facilities utilized during this event. Additional detail supporting these calculations is provided in Attachment B.

Table 4: Results of LID Design Storm Routing

BMP ID	Runoff Volume for 1.1-inch, LID Storm Event (ac-ft)	Storm Hydrograph Upsizing Multiplier for SWMM Routing[1]	Percent of Upsized Storm Treated by Regional LID Facility[2]	Maximum Percent of WQ Volume Utilized during LID Storm	Maximum Ponding Depth during LID Storm (ft)
Facility B	3.9	1.0	100%	21%	1.5
Facility C	0.9	1.5	100%	69%	1.9
Facility D[3]	17.8	1.5	100%	49%	1.8

[1] Upsizing of LID storm hydrographs only applies to facilities utilizing biofiltration (C and D). Facility B hydrographs are not upsized because these facilities do not include biofiltration.
[2] Percent of upsized storm captured and retained or biofiltered in Regional LID Facility.
[3] Includes all areas draining to Regional Facility D (Source: Geosyntec, 2019).

As demonstrated in Table 4, the proposed regional LID facilities fully capture the applicable upsized LID design storm event and comply with the requirement to retain or provide equivalent biofiltration for the 85th percentile, 24-hour storm event. These regional facilities are also sized to treat 80 percent of average annual runoff volume (not demonstrated in this memorandum), which is why they have excess capacity to treat the runoff from the 85th percentile storm event.

4.2.2 Right-of-Way LID BMPs

The LID Performance Standard requires that ROW BMPs to be selected and sized to retain the volume of stormwater runoff produced from a 1.1-inch storm event (i.e., the LID Design Volume) for the Project site. Where it has been demonstrated that 100 percent of the LID Design Volume cannot be feasibly infiltrated, biofiltration shall be provided for 1.5 times the portion of the LID Design Volume that is not retained.

Table 5 summarizes the inputs and outputs in HydroCalc. Model files are provided in Attachment C.

Table 5 HydroCalc Inputs and Outputs for Drainage Area Proposed to be Treated by ROW LID

	"A Street"	"B Street"
HydroCalc Inputs		
Area (acres)	0.74	1.7
Length (feet)	250	250
Slope	0.05	0.05
Depth (inches)	1.1	1.1
Imperviousness[1]	0.91	0.80
Soil Type	98	98
Storm Frequency	85th percentile storm	85th percentile storm
HydroCalc Outputs		
Clear Peak Flow Rate (cfs)	0.29	0.58
24-hr Clear Runoff Volume (cubic feet)	2,436	4,935
Upsized Runoff Volume (150%) for Biofiltration Sizing (cubic feet)	3,654	7,402

[1]Imperviousness of the drainage area is calculated by area-weighted average imperviousness between the multi-use trail and riverbank access road area (50% impervious) and the adjacent developed open space (1% impervious).

As shown in Attachment A, the proposed biofiltration basin for segment of A Street is 75 feet in length and 20 feet in width; the proposed biofiltration basin for segment of B Street is 100 feet in length and 30 feet in width. Both basins are proposed with 12 inches of ponding depth, 24 inches of media layer, a gravel layer underneath and perforated underdrains in the gravel layer to discharge the biofiltered runoff. This vertical profile provides an effective storage depth of 18 inches is provided, assuming 25 percent porosity for the media layer (Virginia Department of Conservation and Recreation, 2011). Therefore, a total of 2,250 cubic feet and 4,500 cubic feet of static volumes are provided for the A Street basin and B Street basin respectively.

Table 6 summarizes the dimensions of the biofiltration LIDs for both streets based on the proposed design and how the LIDs meet the applicable sizing standards.

Table 6 Sizing Conformance Demonstration for Right-of-Way LID BMP

Drainage Area	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)	Provided Static Biofiltra-tion Volume (cubic feet)	Provided Biofiltra-tion Footprint (square feet)	Additional Volume Biofiltered During Storm Duration (cubic feet)[1]	Total Provided Biofiltration Volume (Static+ Routed Volume, cubic feet)	Drawdown Time to Media Surface hours[2]
A St ROW LID	3,654	2,250	1,500	3,750	6,000	2.4
B St ROW LID	7,402	4,500	3,000	7,500	12,000	2.4

1 – Based on a conservative design storm routing time of 6 hours (reduced from HydroCalc duration of 24-hours) and media flowrate of 5 inches per hour over the footprint of the BMP.
2- Based on 12-inch ponding depth and 5 in/hr media flowrate.

As shown in Table 6, the total provided biofiltered volume for the ROW LIDs proposed for the two street segments is substantially more than 150% of runoff volume from the 1.1-inch 85th percentile storm while drawing down completely within 3 hours. Incidental infiltration is not considered in this analysis as a conservative assumption. Therefore, the proposed biofiltration ROW LID fully complies with the requirement to retain or provide biofiltration 150% of runoff from the 85th percentile, 24-hour storm event. These ROW LID facilities are also sized to treat 80 percent of average annual runoff volume (not demonstrated in this memorandum), which is why they have excess capacity to treat the runoff from the 85th percentile storm event.

4.2.3 Parcel-based BMPs

The LID Performance Standard requires that parcel-based to be sized to retain the volume of stormwater runoff produced from a 1.1-inch storm event (i.e., the LID Design Volume) for the Project site. Where it has been demonstrated that 100 percent of the LID Design Volume cannot be feasibly infiltrated, biofiltration shall be provided for 1.5 times the portion of the LID Design Volume that is not retained.

Parcel-based LIDs will be sized with a static volume equivalent to the 1.1-inch LID Design Volume for each parcel area. An underdrain will be used for Category 2 and 3. By following this sizing approach, we demonstrate that the sizing standard above is met regardless of the infiltration feasibility category that is determined.

HydroCalc was used to generate the 1.1" LID Design Volume assuming flow path width of 250 feet and catchment slope of 5%. The imperviousness of each parcel is based on land use and the dominant LA County soil type (020 or 098) underlays each planning area treated by parcel-based

LID is used as soil type input. The HydroCalc inputs and outputs for each parcel are summarized in Table 7. Model files are provided in Attachment C.

Table 7 HydroCalc Inputs and Outputs for Parcels Treated by Parcel-based LID BMPs

Planning Area	Area (ac)	Land Use	Imperv.	Soil Type	Length (ft.)	Slope	24-hr Clear Runoff Volume (cu. ft.)	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)
PA 1	20.8	Commercial	0.91	020	250	0.05	68,337	102,506
PA 2&3	25.6	Commercial	0.91	098			83,960	125940
PA 14	2.7	Commercial	0.91	098			8,829	13,244

If parcel-scale infiltration feasibility study shows that Category 1 (infiltration) BMP is feasible for any parcel proposed to be treated by parcel-based LID BMPs, infiltration BMPs already sized with the static volume equivalent to the LID Design Volume will be able to retain 100% of the LID Design Volume.

If parcel-scale infiltration feasibility study shows that Category 2 (bioinfiltration) or Category 3 (biofiltration) BMP is feasible for any parcel, LID BMPs sized with the static volume equivalent to the LID Design Volume still include an underdrain and media bed with adequate capacity to biofilter 150% of the LID Design Volume with reasonable BMP design assumptions including:

- 12 inches of ponding depth, 24 inches of media layer and a gravel layer underneath with perforated, resulting in 18 inches of effective depth with an assumed media porosity of 0.25 (neglecting the gravel storage);
- 5 inches per hour media filtration rate (the lower limit of the range of filtration rate recommended by the LID Standards Manual);
- 6 hours of routing period during the 24-hour design storm duration (conservative assumption);
- Incidental infiltration into the underlaying soils for Category 2 BMP is not considered (conservative assumption);

Because infiltration is not considered in this analysis, both Category 2 and Category 3 parcel-based LID designs provide an effective storage depth of 18 inches between the ponding and media layer and are identical for the purpose of the conformance analysis. Where some infiltration does occur, the resulting performance would be greater.

The total volume biofiltered is the sum of the static biofiltration volume and the additional volume routed during the storm event. This additional biofiltration volume was calculated by multiplying the media filtration rate (5 inches per hour) by routing time (6 hours) and the provided biofiltration footprint of each parcel. The total capacity of the parcel-based LID is calculated by adding the provided static biofiltration volume and the additional routed biofiltered volume. This sizing conformance demonstration calculation for each parcel is shown in Table 8.

Table 8 shows that providing a static LID volume equal to the runoff from the 1.1" storm results in conformance with sizing criteria regardless of the eventual infiltration feasibility category:

- Where parcels are Category 1, the static volume provided in the LID BMPs (Column D) is equal to the required volume (Column B) without considering any routing. The drawdown (Column H) is well within the 96-hour limit.

- Where parcels are Category 2 or 3, the total biofiltered volume (Column G) substantially exceeds the required biofiltration volume (Column C), even without considering any incidental infiltration and using a conservatively short routing time.

In summary, this sizing analysis demonstrates that parcel-based LIDs sized to the full LID Design Volume can achieve retention or equivalent biofiltration of the LID Design Volume regardless of feasibility conditions that may be encountered during the final parcel improvement phase of the Project.

Table 8 Sizing Conformance Demonstration for Parcel-Based LID BMPs

A	B	C	D	E	F	G	H	I
Parcel ID	**Required Infiltration Volume (if Category 1 Parcel)**	**Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet) (if Category 2 or 3 Parcel)**	**Provided Static LID Volume (cubic feet)**	**Provided LID Footprint (square feet)**	**Additional Volume Biofiltered During Storm Duration from Category 2 or 3 BMPs (cubic feet)[1]**	**Total Biofiltration Volume in Category 2 or 3 BMPs (Static+ Routed Volume, cu-ft)**	**Drawdown of Stored Volume in Category 1 (hours)[2]**	**Drawdown to Media Surface in Category 2 or 3 (hours)[3]**
Planning Area 1	68,337	102,506	68,337	45,558	113,896	182,233	12 - 24	2.4
Planning Area 2&3	83,960	125,940	83,960	55,973	139,933	223,893	12 - 24	2.4
Planning Area 14	8,829	13,244	8,829	5,886	14,716	23,545	12 - 24	2.4

1 – Based on a conservative design storm routing time of 6 hours (reduced from HydroCalc duration of 24-hours) and media flowrate of 5 inches per hour over the footprint of the BMP.
2 – Based on ponding depth of 12 inches and 1 to 2 in/hr infiltration rates, consistent with likely rates in Category 1 areas.
3 – Based on 12-inch ponding depth and 5 in/hr media flowrate.

4.3 Conformance Summary

In summary, this memorandum demonstrates that:

- LID BMPs have been selected in a manner consistent with the LID selection hierarchy (i.e., infiltration feasibility criteria) contained in the LID Performance Standard (Section 4.1), which is consistent with the 2021 MS4 permit;

- The LID project design features proposed as part of the Entrada South Project provide retention and biofiltration volume consistent with the LID Design Volume retention and biofiltration requirements per the LID Performance Standard (Section 4.2), which is consistent with the 2021 MS4 permit.

For areas treated by parcel-based BMPs (Figure 2), the BMPs shall be selected and sized to the satisfaction of LACDPW as part of final parcel improvement plans. Based on the commitments described in Section 4.2, the application of parcel-based BMPs to these areas will satisfy the BMP selection and LID design storm retention and biofiltration requirement in the LID Performance Standard. The basis for this finding is documented in Section 4.1 and 4.2, and the availability of space in typical parcel plans has been demonstrated.

Therefore, the project design features proposed to manage runoff from the Entrada South Project conform to the Project's LID Performance Standard.

5. REFERENCES

Engeo, 2021. Infiltration Feasibility for Low Impact Design (LID) Stormwater Quality Features. Entrada South – Vesting Tentative Tract Map 53295 Newhall Ranch Preliminary

Geosyntec Consultants (Geosyntec), 2010. Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan. Prepared for Newhall Land by Geosyntec Consultants. April 2009, Amended March 2010.

Geosyntec Consultants (Geosyntec), 2019. Memorandum: Mission Village Phase 1, 2, 5 & 6 Water Quality Plan (Regional Facilities B, C and D) – Evaluation of Conformance with Newhall LID Performance Standard. October 9, 2019.

Hunsaker, 2024. LID Exhibit for Entrada South TTM No. 53295.

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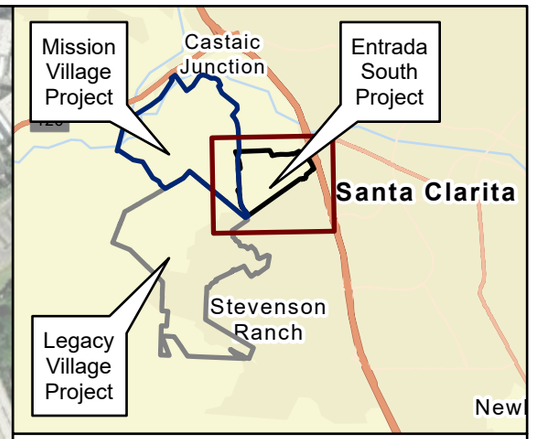
LARWQCB, 2021. Waste Discharge Requirements and National Pollutant Discharge Elimination System (NPDES) Permit for Municipal Separate Storm Sewer System (MS4) Discharges within the Coastal Watersheds of Los Angeles and Ventura Counties (Order No. R4-2021-0105).

Virginia Department of Conservation and Recreation (VA DCR), 2011. Bioretention VDCR Stormwater Design Specification No. 9, Version 1.9.

Figures



Legend

Entrada South Boundary

Land Use

- Commercial
- Multi-Family Residential
- Open Space
- Recreation
- Recreation Trails
- Road
- Access Road
- Water

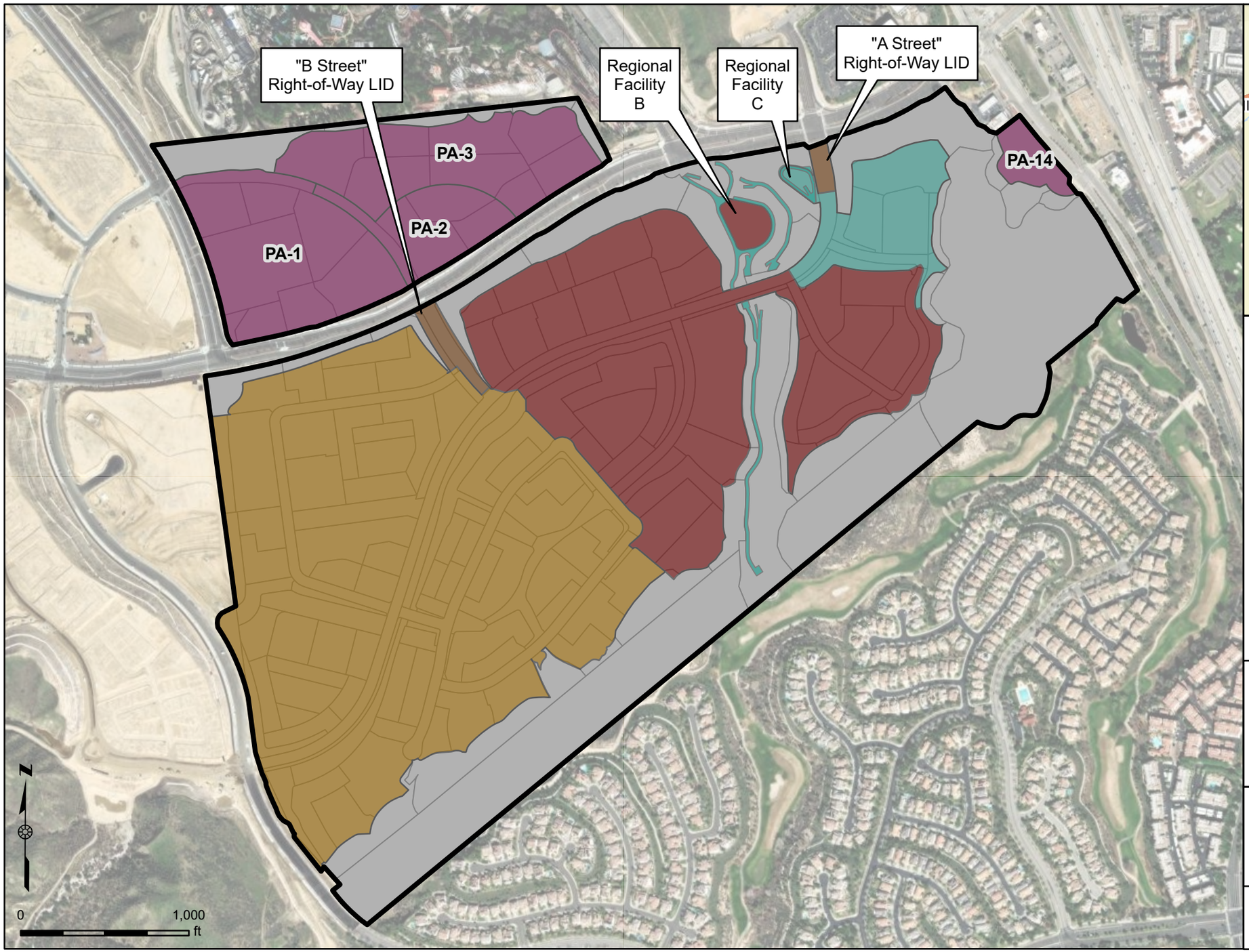
Entrada South Land Use

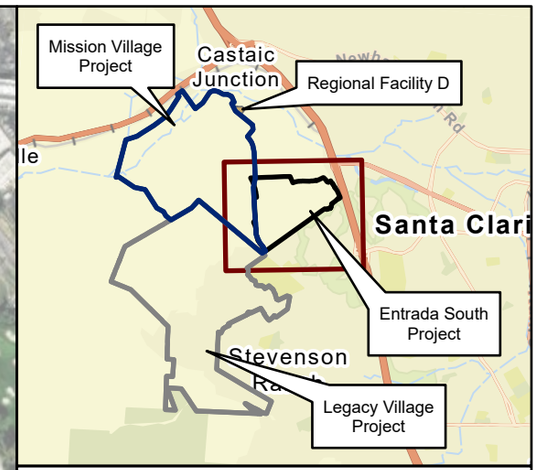
Entrada South Conformance Memo

Geosyntec consultants

November 2024

Figure 1





Legend

Drainage Areas to Proposed Treatment BMPs

- Regional Facility B
- Regional Facility C
- Regional Facility D
- Parcel-Based LID
- Right-of-Way LID
- Open Space Bypassing Treatment

Entrada South Drainage Areas & Treatment Categories

Entrada South Conformance Memo

Geosyntec consultants

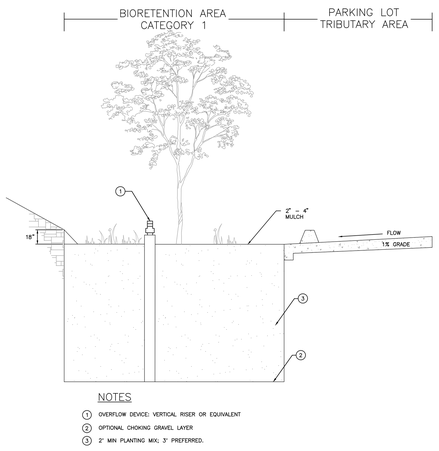
November 2024

Figure 2

Attachments

Attachment A

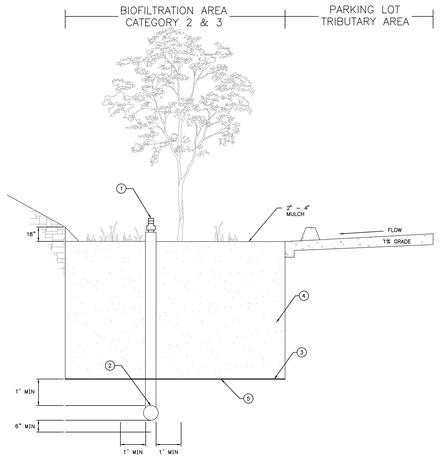
Entrada South LID Exhibit(Geosyntec)-Map



NOTES

1. OVERFLOW DEVICE: VERTICAL RISER OR EQUIVALENT
2. OPTIONAL CHOKING GRAVEL LAYER
3. 2' MIN PLANTING MIX; 3' PREFERRED.

TYPICAL BIORETENTION DETAIL FOR PARCEL BASED LID (CATEGORY 1)
NTS



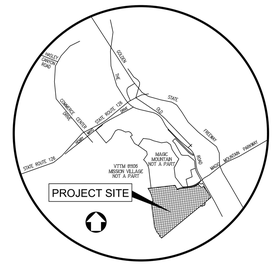
NOTES

1. OVERFLOW DEVICE: VERTICAL RISER OR EQUIVALENT
2. PERFORATED 6" MIN PVC PIPE UNDERDRAIN SYSTEM. WHERE SOIL CONDITIONS ALLOW, OMIT THE UNDERDRAIN AND INSTALL AN APPROPRIATELY SIZED GRAVEL DRAINAGE LAYER (TYPICALLY A WASHED 57 STONE) BENEATH THE PLANTING MEDIA FOR ENHANCED INFILTRATION.
3. OPTIONAL CHOKING GRAVEL LAYER
4. 2' MIN PLANTING MIX; 3' PREFERRED.
5. LINER NOT REQUIRED FOR CATEGORY 2. LINER IS REQUIRED FOR CATEGORY 3.

TYPICAL BIOINFILTRATION DETAIL FOR PARCEL BASED LID (CATEGORY 2 & 3)
NTS

LEGEND:

- EXISTING STORM DRAIN LINE
- PROPOSED STORM DRAIN
- EXISTING WATER QUALITY LINE
- PROPOSED WATER QUALITY LINE
- TRIBUTARY AREA TO BASIN B
- TRIBUTARY AREA TO BASIN C
- TRIBUTARY AREA TO MISSION VILLAGE REGIONAL WATER QUALITY BASIN D
- TRIBUTARY AREA FOR RIGHT-OF-WAY LID "A STREET"
- TRIBUTARY AREA FOR RIGHT-OF-WAY LID "B STREET"
- TRIBUTARY AREA FOR PARCEL BASED TREATMENT AREA PA-1
- TRIBUTARY AREA FOR PARCEL BASED TREATMENT AREA PA-2
- TRIBUTARY AREA FOR PARCEL BASED TREATMENT AREA PA-3
- TRIBUTARY AREA FOR PARCEL BASED TREATMENT AREA PA-14
- AVAILABLE LID FOOTPRINT FOR PARCEL BASED LID
- AVAILABLE LID FOOTPRINT FOR RIGHT-OF-WAY LID
- DIVERSION STRUCTURE
- CDS UNIT

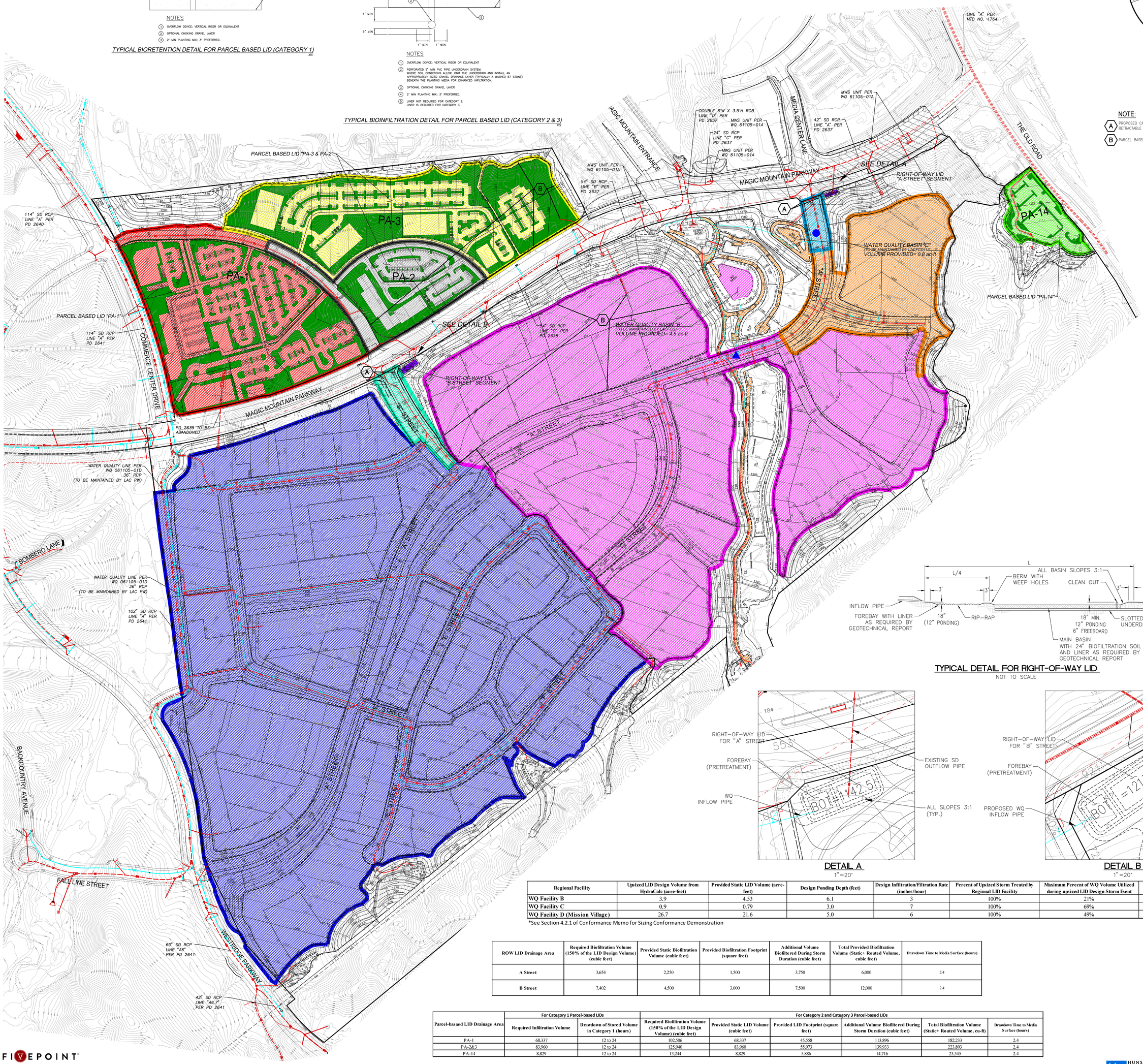


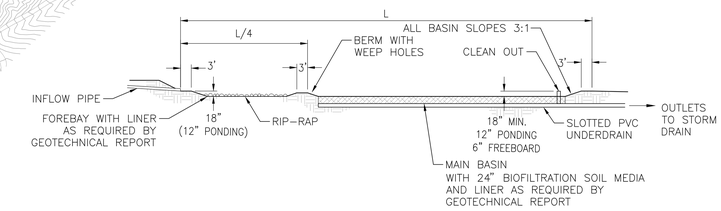
VICINITY MAP
NOT TO SCALE

NOTE:

A. PROPOSED CATCH BASINS SHALL BE INSTALLED WITH ARS (AUTOMATIC RETRACTABLE SCREENS) AND CPS (CONNECTOR PIPE SCREEN).

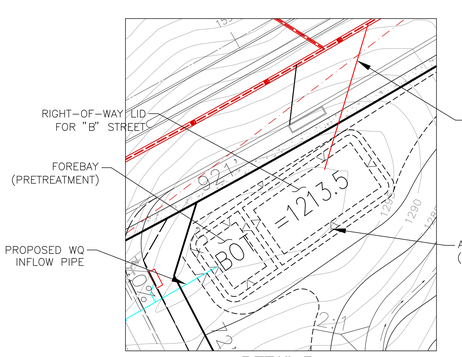
B. PARCEL BASED TRASH CONTROL. CDS OR TRASH EXCLUDING INLETS.





TYPICAL DETAIL FOR RIGHT-OF-WAY LID
NOT TO SCALE

DETAIL A
1"=20'



DETAIL B
1"=20'

Regional Facility	Upsized LID Design Volume from HydroCalc (acre-feet)	Provided Static LID Volume (acre-feet)	Design Ponding Depth (feet)	Design Infiltration/Filtration Rate (inches/hour)	Percent of Upsized Storm Treated by Regional LID Facility	Maximum Percent of WQ Volume Utilized during upsized LID Design Storm Event	Drawdown Time to Media Surface (hours)
WQ Facility B	3.9	4.53	6.1	3	100%	21%	24
WQ Facility C	0.9	0.79	3.0	7	100%	69%	8
WQ Facility D (Mission Village)	26.7	21.6	5.0	6	100%	49%	13

*See Section 4.2.1 of Conformance Memo for Sizing Conformance Demonstration

ROW LID Drainage Area	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)	Provided Static Biofiltration Volume (cubic feet)	Provided Biofiltration Footprint (square feet)	Additional Volume Biofiltered During Storm Duration (cubic feet)	Total Provided Biofiltration Volume (Static+ Routed Volume, cubic feet)	Drawdown Time to Media Surface (hours)
A Street	3,654	2,250	1,500	3,750	6,000	2.4
B Street	7,402	4,500	3,000	7,500	12,000	2.4

Parcel-basaed LID Drainage Area	For Category 1 Parcel-based LIDs		For Category 2 and Category 3 Parcel-based LIDs				
	Required Infiltration Volume	Drawdown of Stored Volume in Category 1 (hours)	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)	Provided Static LID Volume (cubic feet)	Provided LID Footprint (square feet)	Additional Volume Biofiltered During Storm Duration (cubic feet)	Total Biofiltration Volume (Static+ Routed Volume, cu-ft)	Drawdown Time to Media Surface (hours)
PA-1	68,337	12 to 24	102,506	68,337	45,558	113,896	182,233	2.4
PA-2&3	83,960	12 to 24	125,940	83,960	55,973	139,933	223,893	2.4
PA-14	8,829	12 to 24	13,244	8,829	5,886	14,716	23,545	2.4

NORTH

FEET
100' 50' 0 100' 200'
1" = 1/2" 0 2"
INCHES

TRACT 53295
LID EXHIBIT
ENTRADA SOUTH

FIVEPOINT

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DATE: 04/25/23 REV. DATE: 11/08/2024
PROJECT NO: 015-035-019 SHEET 1 OF 1

H53035-01_ENTRADA SOUTH LID EXHIBIT.DWG

Attachment B

Modeling Methodology

engineers | scientists | innovators

Geosyntec consultants

Attachment B

Modeling Methodology in Support of LID Conformance Analysis

1. INTRODUCTION

The purpose of this attachment is to describe the modeling methodology used to demonstrate that the proposed regional infiltration/bioinfiltration facilities for the Entrada South Project (Project) are sized to satisfy the retention or equivalent biofiltration of the 85th Percentile, 24-hour Storm Event requirement in the Project LID Performance Standard.

To demonstrate that each regional facility meets this standard, the LID design storm runoff time series were calculated using HydroCalc for tributary area to each regional facility and subsequently used as input inflow times series to storage units representing the detailed hydraulic characteristics of the proposed regional facilities (stage-storage, infiltration, filtration and overflow) in an USEPA Stormwater Management Model (SWMM).

Subcatchments tributary to each facility were defined based on land use delineations, drainage boundaries, results of infiltration feasibility screening, and soil parameters. Regional facilities within the Project were modeled in SWMM. Based on the proposed facility sizes and configurations, watershed LID performance results were evaluated to demonstrate that the regional LID facilities achieve the retention or equivalent biofiltration of the 85th Percentile, 24-hour Storm Event requirement in the LID Performance Standard.

Part of Entrada South drains to Regional Facility D in the adjacent Mission Village Project. The facility design and tributary areas were previously documented in Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019). Since the time of that memorandum, the land uses and drainage areas from Entrada South have changed. This memorandum documents the updated Entrada South drainage areas and land uses. It also includes the full updated model files and results to demonstrate that Regional Facility D is still adequately sized. The regional facility itself is not changed compared to the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019). Additionally, drainage areas outside of Entrada South are not changed except for a small difference in imperviousness in Mission Village. Therefore, this memorandum does not include a description of the other areas draining to Regional Facility D as these are still consistent with the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum.

Detailed model input and output files from HydroCalc and SWMM are annotated and provided in Attachment C.

2. WATERSHED MODELING

Each subcatchment tributary to each regional BMP is modeled using HydroCalc. Subcatchment parameter input and the output are summarized in the following sections. Hydrographs from each tributary during the 85th percentile 1.1-inch 24-hour storm was generated using HydroCalc and used as input for the EPA SWMM model detailed in Section 3.

2.1. Regional Facility Tributary Area and Imperviousness

The tributary drainages treated by each of the Project regional facilities were represented per the *LID Exhibit for Entrada South* (Hunsaker, 2024). Table 2-1 includes the drainage subbasins and imperviousness values used for areas within the Entrada South boundary that are proposed to drain to Facilities B, C and Regional Facility D in Mission Village.

Table 2-1: Modeled Developed Conditions Project– Facilities B, C, and D

Facility	Land Use	Acreage	Imperviousness
Facility B	Multi-Family Residential	50.3	74
	Open Space	9.2	1
	Recreation	2.0	80
	Recreation Trails	4.2	10
	Road	4.6	91
	Water Quality Facility	0.6	100
Facility B Total		**70.9**	**62**
Facility C	Multi-Family Residential	7.9	74
	Open Space	1.9	1
	Recreation Trails	0.3	10
	Road	1.1	91
	Access Road	4.6	80
	Water Quality Facility	0.4	100
Facility C Total		**16.1**	**68**
Facility D	Multi-Family Residential	82.2	74
	Open Space	11.5	1
	Recreation	1.7	80
	Recreation Trails	8.4	10
	Road	15.1	91
Facility D Total[1]		**118.8**	**65**

[1] Facility D Total refers to contributing subbasins within Entrada South project boundary only. See Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019) for contributing subbasin characteristics outside Entrada South project boundary.

Regional Facility D was modeled based on the ultimate proposed condition of its drainage area, as described in the memorandum: "Mission Village Phase 1, 2, 5 & 6 Water Quality Plan (Regional Facilities B, C and D) – Evaluation of Conformance with Newhall LID Performance Standard" (Geosyntec Consultants, 2019). The drainage area from Entrada South and the imperviousness in Mission Village tributary area changed somewhat since the Mission Village memorandum; the current proposed Entrada South drainage area was modeled to demonstrate that Regional Facility

D is adequately sized. A comparison of the total tributary area to Regional Facility D between the current model and the model documented in the Mission Village Conformance Memorandum is presented in Table 2-2.

Table 2-2: Summary of Tributary Area to Regional Facility D and Comparison with Scenario Modeled in the Mission Village Conformance Memorandum.

Model Scenario	Project Location	Tributary Area (Acres)	Impervious Fraction of Catchment (%)
Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum	Mission Village	115.0	66.6
	Entrada South	121.5	52.3
	Existing Westridge	95.6	49.1
	Total	**332.1**	**56.3**
Entrada South Conformance Memorandum	Mission Village	115.0	68.6
	Entrada South	118.8	64.7
	Existing Westridge	95.6	49.1
	Total	**329.4**	**61.5**

2.2. Other Subcatchment Input Parameters

According to the LA County Soils Map (LACDPW, 2023), LA County soil type 098 is the underlying soils for vast majority of the Entrada South project area. Therefore, this soil type is used as soil type input for all of the tributary areas to the regional facilities. In addition, flow path length of 250 feet and flow path slope of 5% were assumed inputs for the tributary areas to the regional facilities.

2.3. HydroCalc Output

The peak runoff flow rates and total runoff volumes during the 1.1-inch 24-hour storm from the three tributary areas within the Project boundary draining to Regional Facility B, C and D from HydroCalc output are summarized in Table 2-3. The hydrographs from these three drainage areas are also illustrated in Attachment C. The output hydrograph for area draining to Facility B will be used as inflow input for the SWMM model detailed in Section 3. The output hydrographs for areas draining to Facility C and D will be multiplied by 150% and used as inflow input for the SWMM model because these two facilities because the design of them include biofiltration.

Table 2-3. HydroCalc Output for Tributary Areas within Entrada South Draining to Regional Facility B, C and D during 85th Percentile 1.1-inch 24-hour Storm

HydroCalc Output	Facility B	Facility C	Facility D (within Entrada South Boundary)
Clear Peak Flow Rate (cfs)	20.3	5.1	26.9
24-Hr Clear Runoff Volume (ac-ft)	3.9	0.97	6.7

3. REGIONAL FACILITY MODELING

3.1. EPA SWMM Model Input

A design storm simulation is performed in SWMM using the hydrographs generated by HydroCalc as input the incorporating the hydraulic properties of the proposed regional facilities. The general simulation parameters are provided in Table 3-1.

Table 3-1: SWMM Model Parameters

Parameter	Description	Parameter Value
Routing time step	Seconds	30 sec
Routing Option	Method of routing flows through the system	Kinematic Wave method
Inflow Time Series	Runoff hydrographs from the 1.1-inch 24-hour design storm documented in Section 2 and detailed in Attachment C	HydroCalc output

3.2. Model Representation

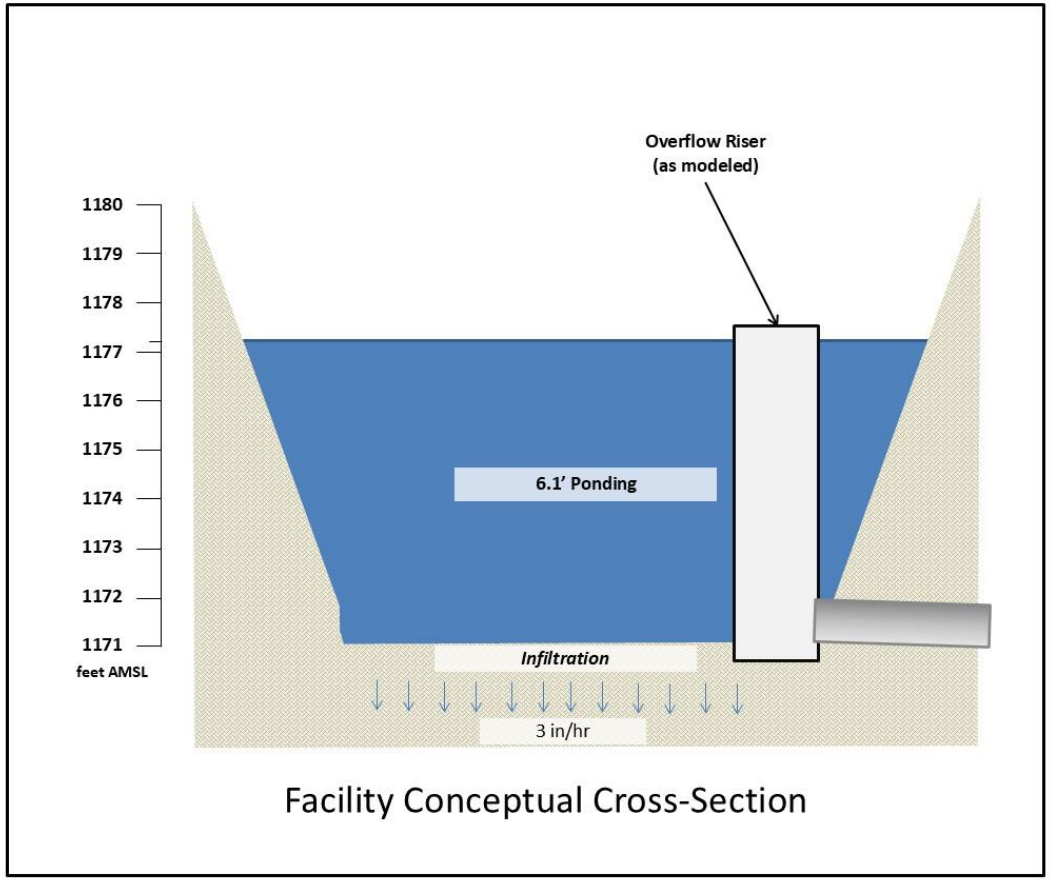
Regional facilities were modeled using a stage-area table to define volume properties and SWMM's built-in hydraulic control elements (e.g., orifices, weirs, outlets) to define discharge from the system (e.g., treated discharge, infiltration, overflow) as a function of the depth of stored water. These facilities were modeled to receive runoff from developed portions of the Project accounting for diversion structures. Regional Facility D was modeled to receive runoff from tributary areas in Mission Village, Legacy Village, and Entrada South. Modeling of Mission Village Facility D is described in the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019).

During the design storm simulation, the inflow hydrograph generated from the HydroCalc is routed into the regional facilities in SWMM, accounting for the hydrologic water balance, conceptual diversion structure, and hydraulic flow control.

Facility sizing was conducted with model infiltration rates, which is consistent with the recommendations by Engeo (2021). The infiltration feasibility report (Engeo, 2021) recommends the design of an infiltration facility for Regional Facility B with a corrected infiltration rate of 3.0 inches per hour based on the infiltration feasibility study (Engeo, 2021). Regional Facility C is a Category 2 basin per the infiltration feasibility study. As a conservative assumption, the underlaying infiltration from the Category 2 Basin A is not modeled in SWMM. Regional Facility D is proposed as a biofiltration facility (lined, no infiltration) due to low soil infiltration rate; the basis for this decision is further discussed in the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019).

Schematic drawings of Regional Facility B, C and D are illustrated in Figure 1 through Figure 3. Regional Facility D was modeled and documented as part of the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019).

Entrada South Regional Facility B - Infiltration



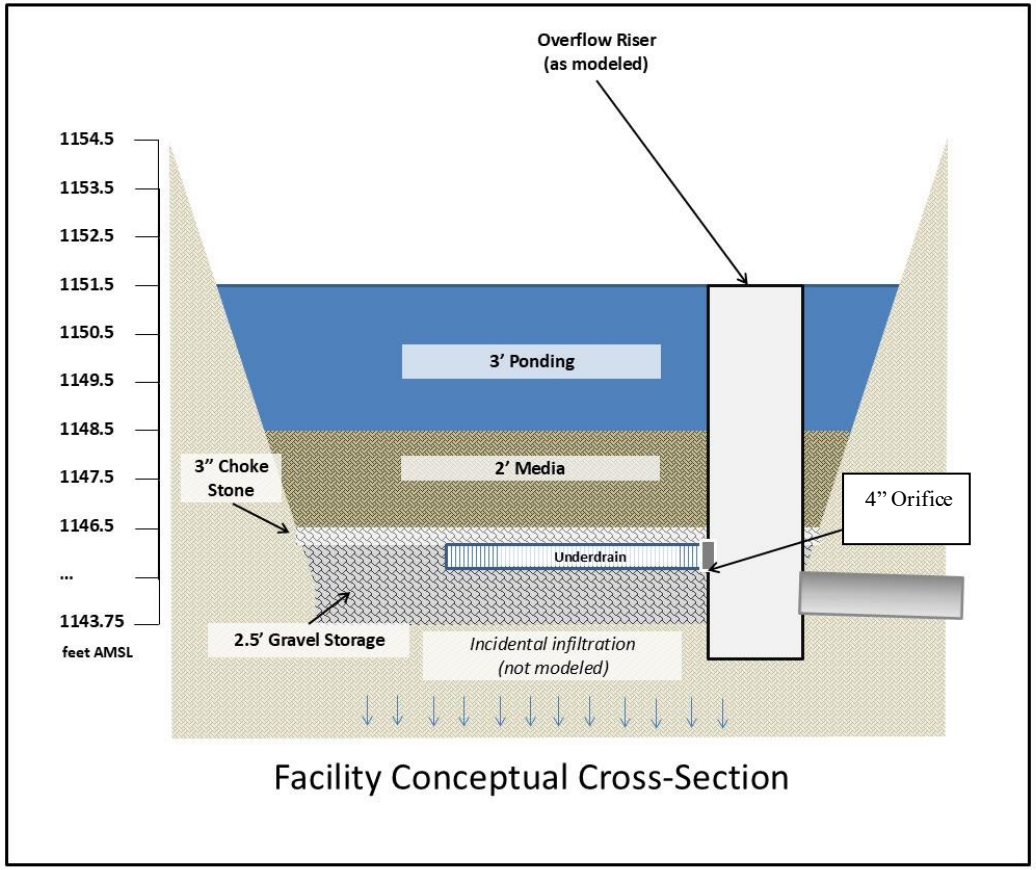
Facility Stage-Area Curve

Elevation, ft AMSL	Depth from Media Surface, ft	Area, sq-ft
1171	**0**	25,987
1172	**1**	27,945
1173	**2**	29,973
1174	**3**	32,063
1175	**4**	34,209
1176	**5**	36,619
1177	**6**	39,156
1177.1	**6.1**	39,441
1178	**7**	42,006
1179	**8**	45,127
1180	**9**	48,619

Total Storage Volume @ 1177.1 ft AMSL:
4.5 ac-ft

Figure 1: Schematic and Respective Cross-Section Depths of Entrada South Infiltration Facility B

Entrada South Regional Facility C - Bioinfiltration



Facility Conceptual Cross-Section

Facility Stage-Area Curve

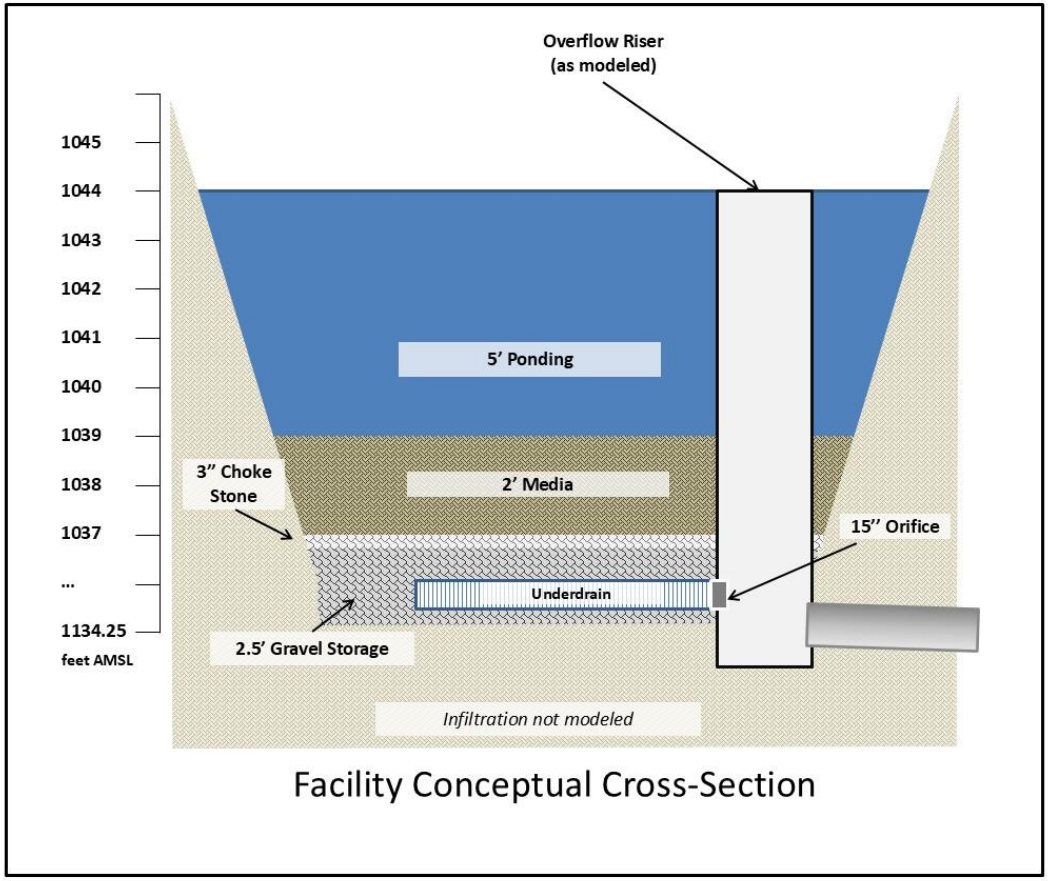
Depth from Media Surface, ft	Layer Base Elevation, ft AMSL	Area, sq-ft	Material	Porosity, %
-	1143.75	6,235	gravel	40
-	1146.25	6,235	choke stone	40
-	1146.5	6,235	media	25
0	1148.5	6,235	ponding	100
1	1149.5	7,432	ponding	100
2	1150.5	8,713	ponding	100
3	1151.5	10,108	ponding	100
4	1152.5	11,647	ponding	100
5	1153.5	13,242	ponding	100
6	1154.5	15,651	ponding	100

Total Ponding Volume @ 1151.5 ft AMSL:
0.56 ac-ft

Total Storage Volume @ 1151.5 ft AMSL (including pore space):
0.79 ac-ft

Figure 2: Schematic and Respective Cross-Section Depths of Entrada South Bioinfiltration Facility C

Mission Village Regional Facility D - Biofiltration



Facility Conceptual Cross-Section

Facility Stage-Area Curve

Depth from Media Surface, ft	Elevation, ft AMSL	Area, sq-ft	Material	Porosity, %
-	1034.25	133,120	base	-
-	1036.75	133,120	gravel	40
-	1037	133,120	choke stone	40
-	1037.01	133,120	media	25
-	1039	133,120	media	25
0	1039.01	133,120	ponding	100
1	1040	137,986	ponding	100
2	1041	142,949	ponding	100
3	1042	147,953	ponding	100
4	1043	153,029	ponding	100
5	1044	158,264	ponding	100
6	1045	163,389	ponding	100

Total Ponding Volume @ 1144 ft AMSL:
16.7 ac-ft

Total Storage Volume @ 1144 ft AMSL (including pore space):
21.6 ac-ft

Figure 3: Schematic and Respective Cross-Section Depths of Mission Village Biofiltration Facility D

The regional facilities will be off-line. Water will be diverted at diversion structures and/or flow-splitting inlets: flow up to the required treatment flowrates will be diverted to the water quality basins and the high flow will bypass the basins. The required minimum diversion flowrates to each facility were determined using HydroCalc for the 1.1-inch storm event. Basin C and D includes biofiltration; therefore, the diversion was sized for 1.5 times the peak of the 1.1-inch storm in the EPA SWMM model. Table 3-2 shows the required diversion flowrates and the detailed HydroCalc inputs and outputs are provided in Attachment C.

Table 3-2: Required Diversion Flowrates to Regional Facilities

BMP ID	Required Minimum Diversion Structure Flowrate, cfs
Regional Facility B	20.3
Regional Facility C	7.7
Regional Facility D	40.3

An example EPA SWMM model with explanation of each element in the model for regional facilities are provided in Figure 4 (Category 1 facilities) and Figure 5 (Category 2 and 3 facilities). Detailed SWMM model input and output files are provided in Attachment C.

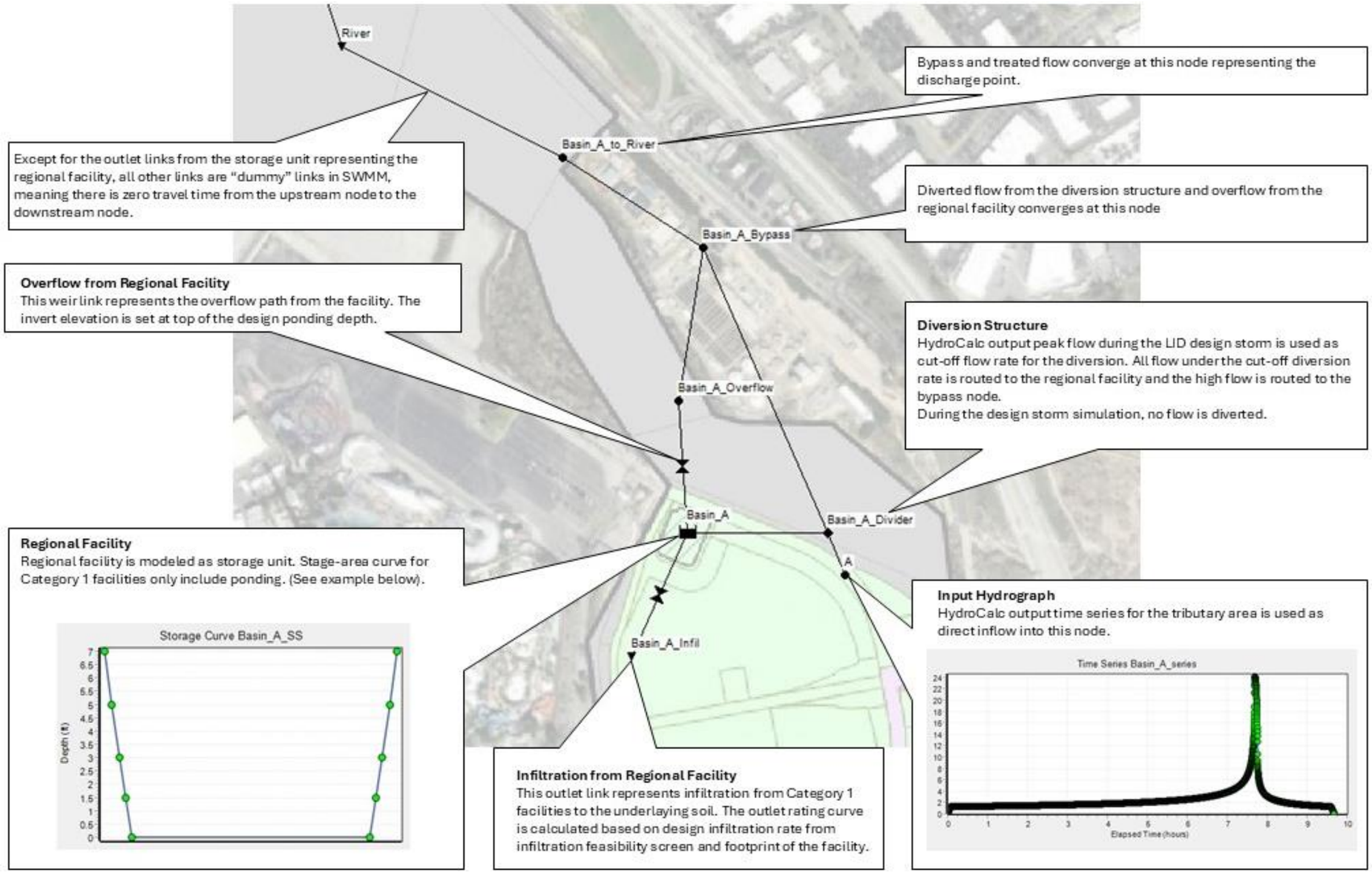


Figure 4 Explanation of EPA SWMM Model of an Example Regional Facility (Category 1)

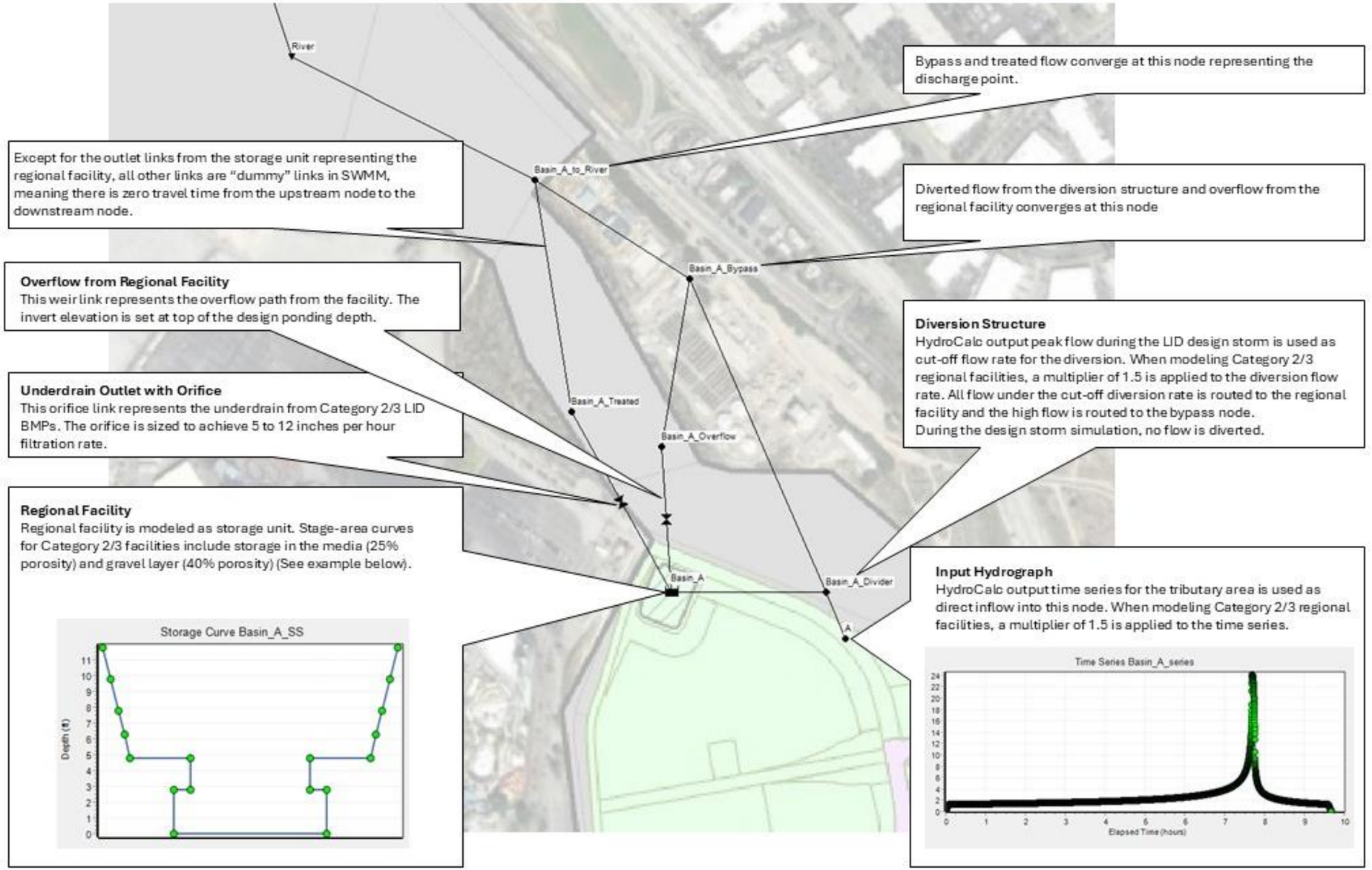


Figure 5 Explanation of EPA SWMM Model of an Example Regional Facility (Category 2 - 3)

3.3. Regional Facility Modeling Results

The provided sizes of the regional facilities is required to satisfy the LID performance standard to infiltrate 100% of the 1.1-inch storm event or biofilter 150% of the 1.1-inch storm event that is not retained. As summarized above, HydroCalc was used to generate input hydrographs that were routed through the SWMM models. These input hydrographs were based on the clear flows for the 1.1-inch LID design event; a multiplier of 1.5 was used for the bioinfiltration and biofiltration basins. The model was run to simulate the duration of the stormwater runoff from the LID design storm. The maximum ponding depth during the simulation were extracted from the SWMM model results and compared to the provided ponding depth for all three proposed regional facilities. As shown in Table 3-3, the maximum ponding depths for all three regional facilities did not exceed the provided ponding depths and therefore the provided sizes of the regional facilities satisfy the sizing requirement to infiltrate 100% of the 1.1-inch storm event or biofilter 150% of the 1.1-inch storm event that is not retained.

Table 3-3: Maximum Depth during 1.1-Inch Storm Event and Ponding Depth Comparison for Regional Facilities

Regional Facility	1.1-inch Storm Event Scaling Factor[1]	Maximum Ponding Depth during Scaled 1.1-inch Storm Event[2] (ft)	WQ Ponding Depth Provided (ft)
B	1.0	1.5	6.1
C	1.5	1.9	3.0
D	1.5	1.8	5.0

1-Scaling factor of 1.0 applies to infiltration basins; scaling factor of 1.5 applies to bioinfiltration and biofiltration basins.
2-Maximum ponding depth above media surface. For Facility B which has no biofiltration component, this is the maximum ponding depth above the basin floor.

To ensure that facilities fall within target operational parameters for regional facilities, including drawdown time and media filtration rate, the inflow time series to the regional facilities in the SWMM model was modified such that the facilities were filled up to their respective overflow stages and the modeling results were extracted during the drawdown process from overflow stage to the media surface. According to the LA County LID Standards Manual, the target drawdown time to the surface of the facility was less than 96 hours and the target media filtration rate was between 5 and 12 inches per hour. As shown in Table 3-4, facility performance was consistent with these targets.

Table 3-4: Regional Facility Operational Parameters

Regional Facility	Estimated Drawdown Time to Surface of Facility from Brim Full, hours	Estimated Maximum Media Filtration Rate when system is at overflow stage, in/hr	Basis
Target	< 96	5 - 12	LA County LID Standards Manual
Regional Facility B	24	N/A	Extracted from model output
Regional Facility C	8	7	Extracted from model output
Regional Facility D	13	6	Extracted from model output

Note: Facility outlet structures subject to refinement as part of detailed design; facility operational parameters are subject to minor revision within target bounds.

4. SUMMARY

This attachment describes the modeling methodology used to evaluate the overall performance of water quality/LID design features proposed within the watersheds tributary to Facilities B, C and Facility D located within Mission Village. The analysis documented in this attachment demonstrated that the regional facilities proposed for the Project are sized to satisfy the retention or equivalent biofiltration of the 85th Percentile, 24-hour Storm Event requirement in the Project LID Performance Standard. The modeling approach incorporates civil and geotechnical design information that is available at this time for the facilities. This approach results in an estimate of overall performance that is considered to be reliable for evaluating the conformance to the LID Performance Standard applicable to the Project.

Note, that modeling of Regional Facility D is documented in the Mission Village Phase 1, 2, 5 & 6 Conformance Memorandum (Geosyntec, 2019). This memorandum does not document the drainage areas for the other projects that drain to Basin D. This memorandum does document the updated drainage area from Entrada South and the updated modeling results for Regional Facility D that incorporate updates from the tributary area draining from within the Entrada South project.

5. REFERENCES

Engeo, 2021. Analysis of Infiltration Feasibility for Entrada South Project. Entrada South – Vesting Tentative Tract Map 53295 Newhall Ranch Preliminary Infiltration Feasibility for Low Impact Design (LID) Stormwater Quality Features.

Geosyntec Consultants (Geosyntec), 2019. Memorandum: Mission Village Phase 1, 2, 5 & 6 Water Quality Plan (Regional Facilities B, C and D) – Evaluation of Conformance with Newhall LID Performance Standard. October 9, 2019.

Hunsaker, 2024. LID Exhibit for Entrada South TTM No. 53295.

Attachment C

Model Files

APPENDIX B.1: HYDROCALC AND SWMM INPUTS AND OUTPUTS

HydroCalc Regional Facilities B, C, and D, Inputs Table

HydroCalc Parcel-Based and Right-of-Way LIDs, Inputs Table

HydroCalc Regional Facilities B, C, and D, Output Files

HydroCalc Parcel-Based and Right-of-Way LIDs, Output Files

Entrada South Regional Facilities B and C, 1.1-Inch Storm Input File

Entrada South Regional Facility B and C, 1.1-Inch Storm Output File

Mission Village Regional Facility D, 150% 1.1-Inch Storm Input File

Mission Village Regional Facility D, 150% 1.1-Inch Storm Output File

Text has been inserted in red boxes in key locations to orient the reviewer to critical modeling inputs and outputs.

HydroCalc Inputs – Regional Facilities B, C, and D			
Subarea ID	**B**	**C**	**Basin D - ES**
Area (ac)	70.88	16.14	118.8
Flow Path Length (ft)	250	250	500
Flow Path Slope (vft/hft)	0.05	0.05	0.05
85th Percentile Rainfall Depth (in)	1.1	1.1	1.1
Percent Impervious	0.6229	0.6822	0.6468
Soil Type	98	98	98
Design Storm Frequency	85th percentile storm	85th percentile storm	85th percentile storm
Fire Factor	0	0	0

HydroCalc Inputs – Parcel-Based and Right-of-Way LIDs					
Subarea ID	**PA-1**	**PA-2&3**	**PA-14**	**A St ROW**	**B St ROW**
Area (ac)	20.8	25.6	2.7	0.7	1.7
Flow Path Length (ft)	250	250	250	250	250
Flow Path Slope (vft/hft)	0.05	0.05	0.05	0.05	0.05
85th Percentile Rainfall Depth (in)	1.1	1.1	1.1	1.1	1.1
Percent Impervious	0.91	0.91	0.91	0.91	0.80
Soil Type	20	98	98	98	98
Design Storm Frequency	85th percentile storm	85th percentile storm	85th percentile storm	85th percentile storm	85th percentile storm
Fire Factor	0	0	0	0	0

Peak Flow Hydrologic Analysis

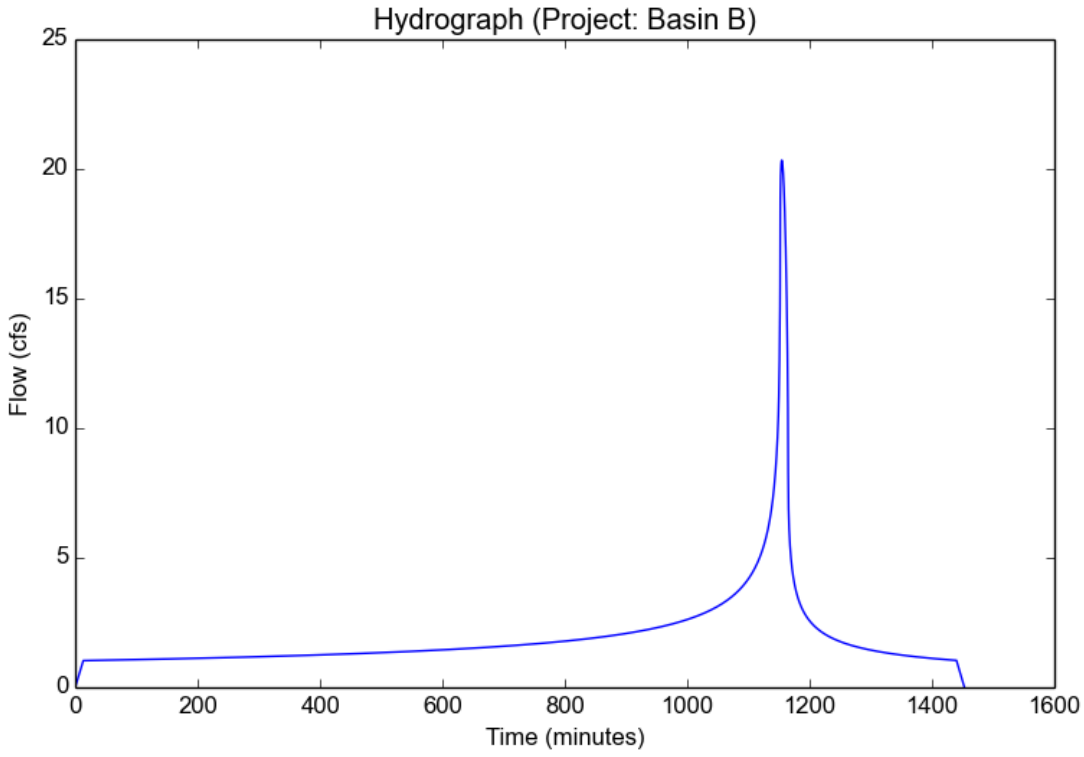
File location: P:/Clients/Newhall_Land/Projects/CWR0782_ES_VCC_Hydrology_2022/Entrada_South/Conformance Memo/Round_4_Dec2023/Project -
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project
Subarea ID	Basin B
Area (ac)	70.88
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.6229
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4188
Undeveloped Runoff Coefficient (Cu)	0.33
Developed Runoff Coefficient (Cd)	0.685
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	20.3375
Burned Peak Flow Rate (cfs)	20.3375
24-Hr Clear Runoff Volume (ac-ft)	3.8893
24-Hr Clear Runoff Volume (cu-ft)	169416.4834



Peak Flow Hydrologic Analysis

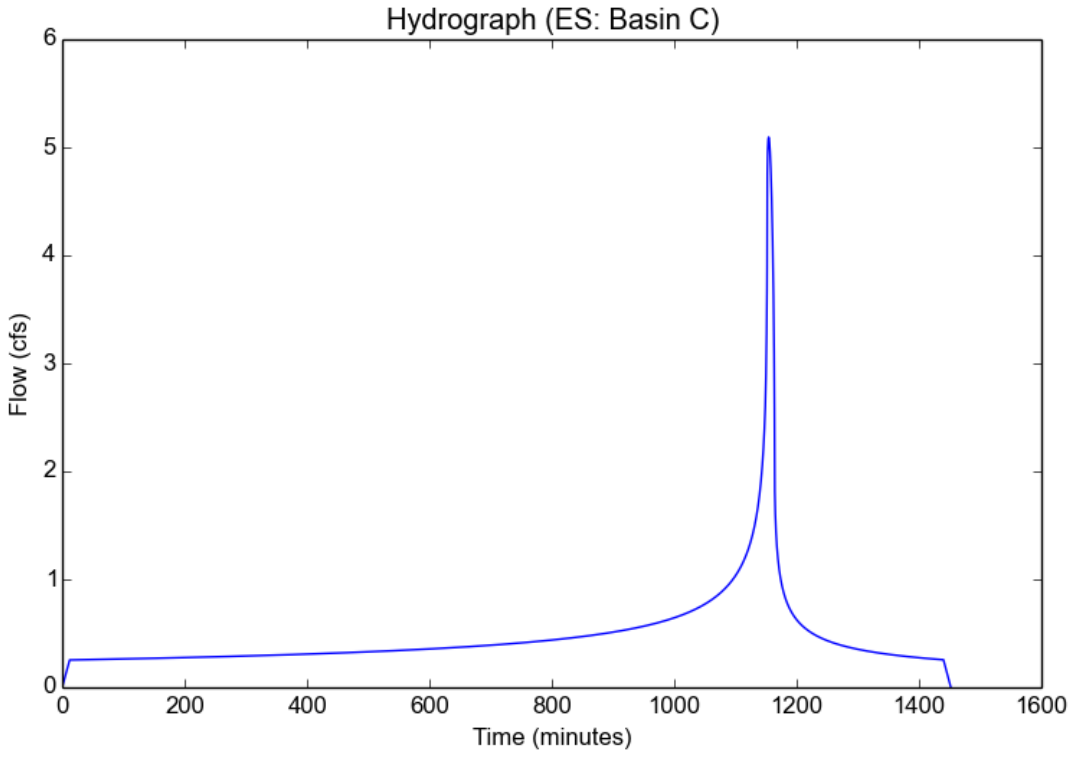
File location: P:/Clients/Newhall_Land/Projects/CWR0782_ES_VCC_Hydrology_2022/Entrada_South/Conformance Memo/Round_5_Oct2024/Attachme
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	Basin C
Area (ac)	16.14
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.6822
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4349
Undeveloped Runoff Coefficient (Cu)	0.3518
Developed Runoff Coefficient (Cd)	0.7258
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	5.0946
Burned Peak Flow Rate (cfs)	5.0946
24-Hr Clear Runoff Volume (ac-ft)	0.9545
24-Hr Clear Runoff Volume (cu-ft)	41577.4298



Peak Flow Hydrologic Analysis

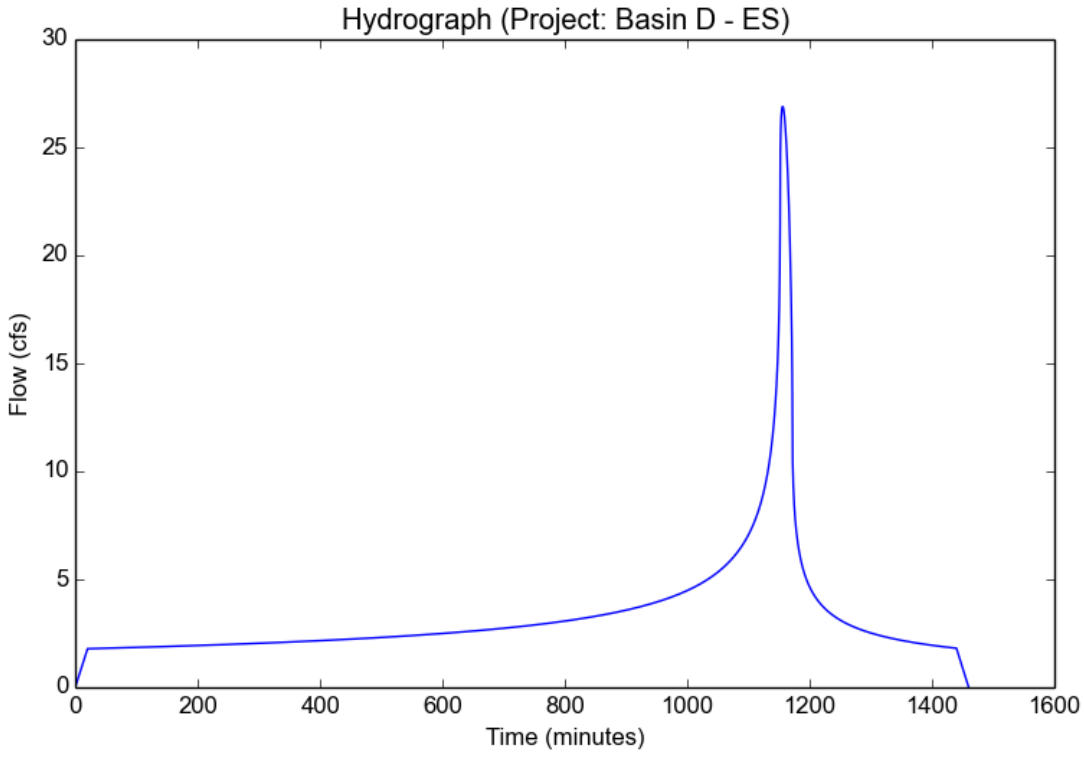
File location: P:/Clients/Newhall_Land/Projects/CWR0782_ES_VCC_Hydrology_2022/Entrada_South/Conformance Memo/Round_4_Dec2023/Project -
Version: HydroCalc 1.0.3

Input Parameters

Project Name	Project
Subarea ID	Basin D - ES
Area (ac)	118.8
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.6468
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.3421
Undeveloped Runoff Coefficient (Cu)	0.2254
Developed Runoff Coefficient (Cd)	0.6617
Time of Concentration (min)	20.0
Clear Peak Flow Rate (cfs)	26.8923
Burned Peak Flow Rate (cfs)	26.8923
24-Hr Clear Runoff Volume (ac-ft)	6.6997
24-Hr Clear Runoff Volume (cu-ft)	291836.9449



Peak Flow Hydrologic Analysis

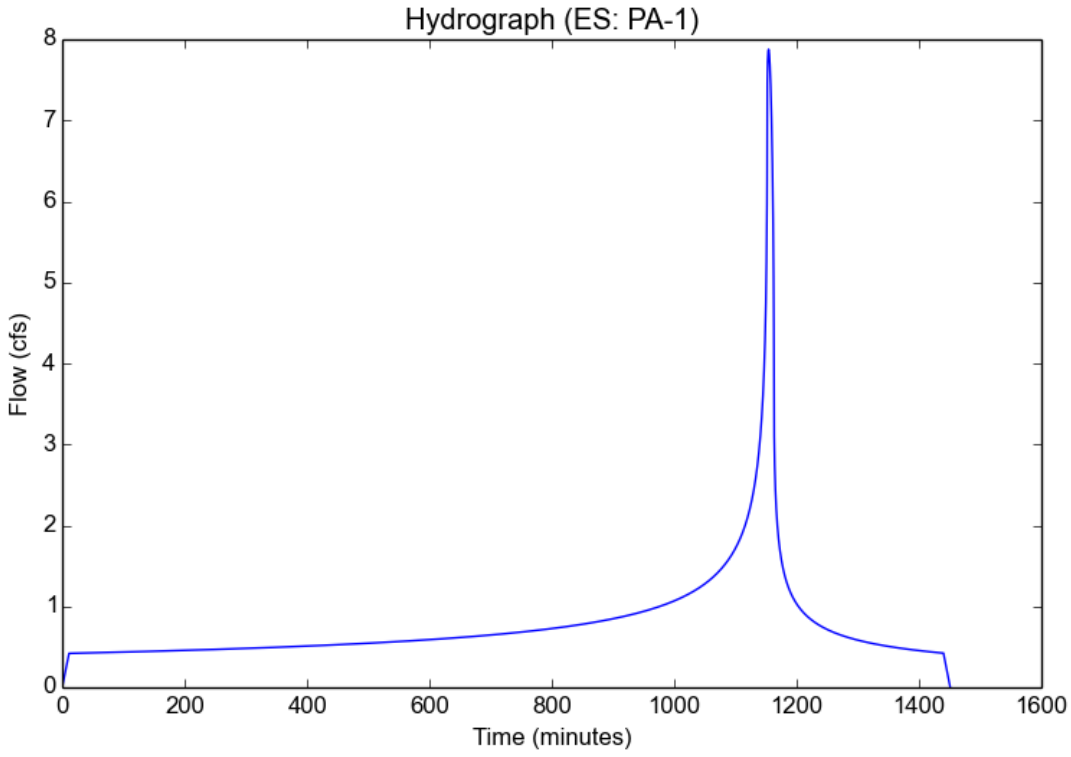
File location: C:/Users/lindsey.spencer/OneDrive - Geosyntec/Desktop/HydroCalc/ES Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	PA-1
Area (ac)	20.83318466
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.1723
Developed Runoff Coefficient (Cd)	0.8345
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	7.8767
Burned Peak Flow Rate (cfs)	7.8767
24-Hr Clear Runoff Volume (ac-ft)	1.5688
24-Hr Clear Runoff Volume (cu-ft)	68337.463



Peak Flow Hydrologic Analysis

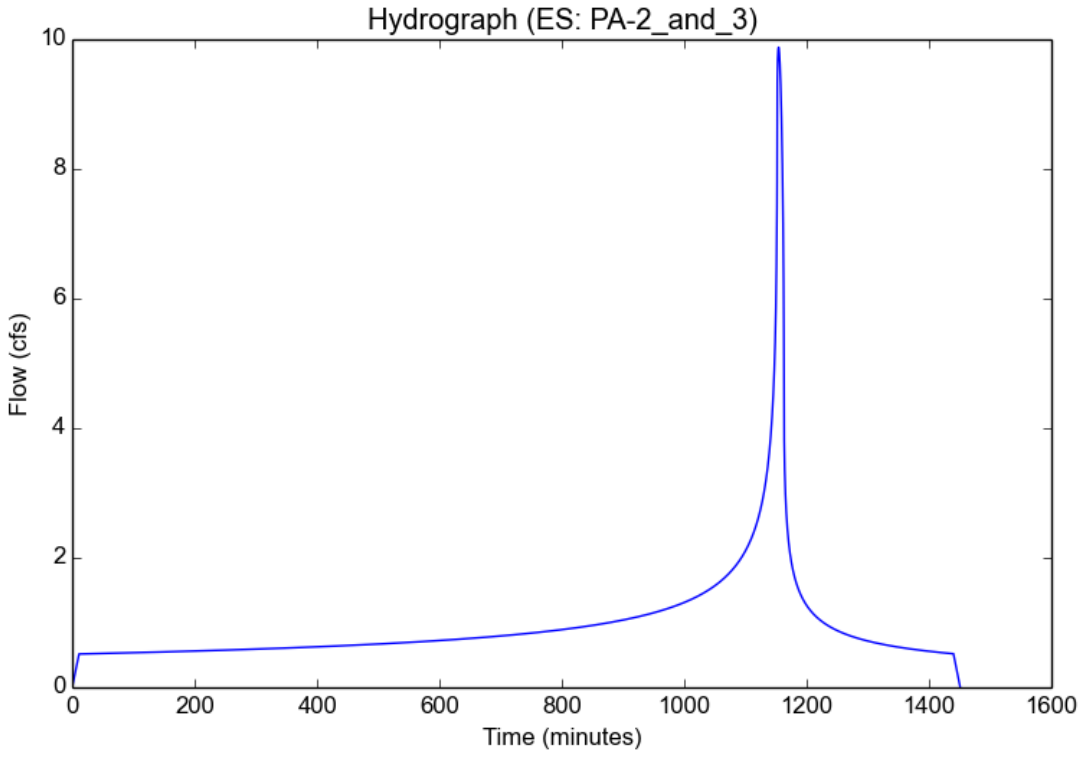
File location: C:/Users/lindsey.spencer/OneDrive - Geosyntec/Desktop/HydroCalc/ES Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	PA-2_and_3
Area (ac)	25.56162241
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.3766
Developed Runoff Coefficient (Cd)	0.8529
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	9.8773
Burned Peak Flow Rate (cfs)	9.8773
24-Hr Clear Runoff Volume (ac-ft)	1.9275
24-Hr Clear Runoff Volume (cu-ft)	83959.8332



Peak Flow Hydrologic Analysis

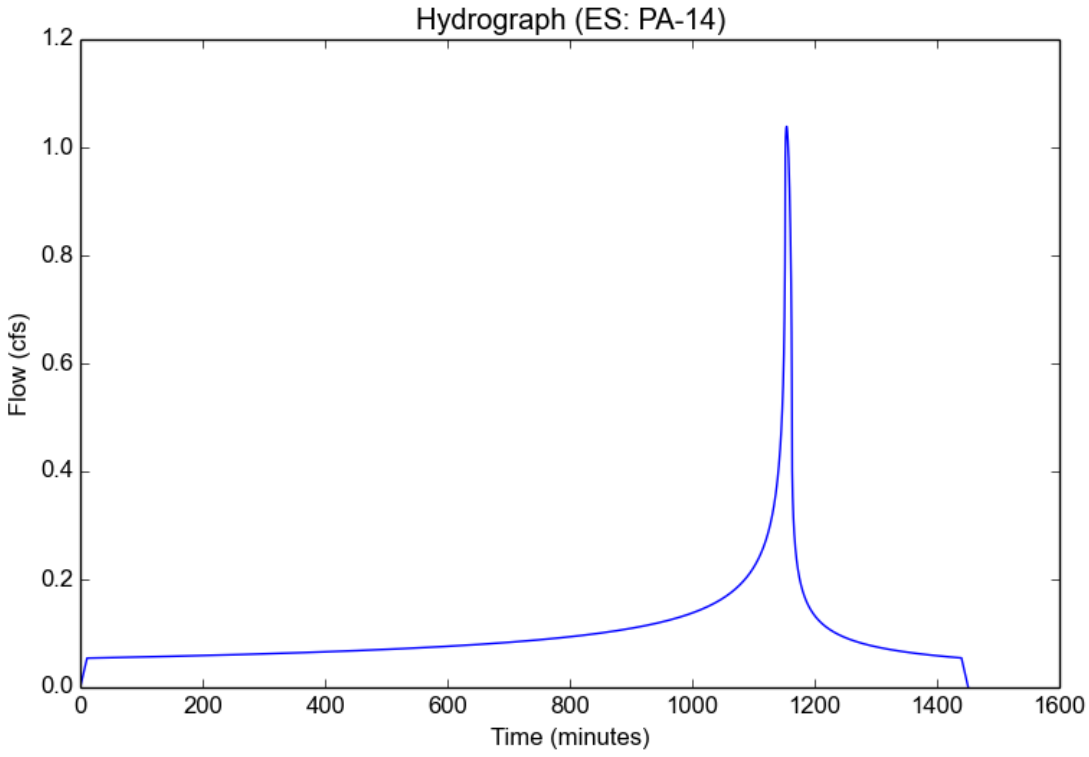
File location: C:/Users/lindsey.spencer/OneDrive - Geosyntec/Desktop/HydroCalc/ES Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	PA-14
Area (ac)	2.688091755
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.3766
Developed Runoff Coefficient (Cd)	0.8529
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	1.0387
Burned Peak Flow Rate (cfs)	1.0387
24-Hr Clear Runoff Volume (ac-ft)	0.2027
24-Hr Clear Runoff Volume (cu-ft)	8829.3197



Peak Flow Hydrologic Analysis

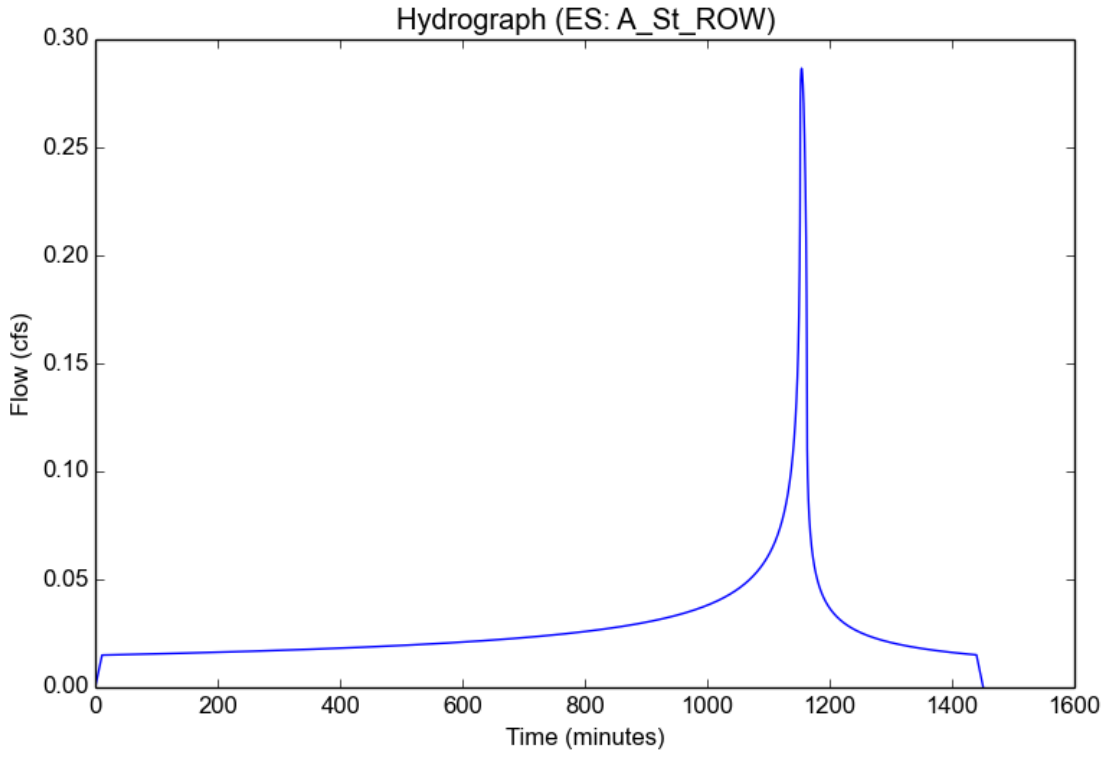
File location: C:/Users/lindsey.spencer/OneDrive - Geosyntec/Desktop/HydroCalc/ES Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	A_St_ROW
Area (ac)	0.741638422
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.3766
Developed Runoff Coefficient (Cd)	0.8529
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	0.2866
Burned Peak Flow Rate (cfs)	0.2866
24-Hr Clear Runoff Volume (ac-ft)	0.0559
24-Hr Clear Runoff Volume (cu-ft)	2435.9893



Peak Flow Hydrologic Analysis

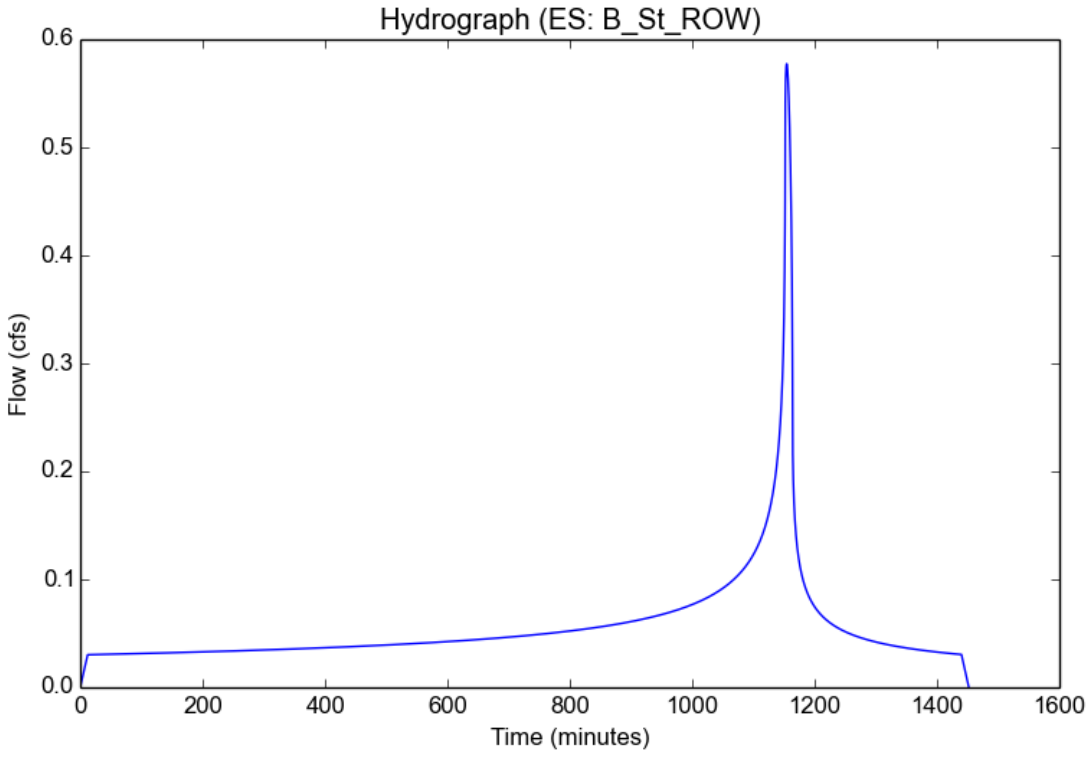
File location: C:/Users/lindsey.spencer/OneDrive - Geosyntec/Desktop/HydroCalc/ES Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	ES
Subarea ID	B_St_ROW
Area (ac)	1.684358968
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.795951275
Soil Type	98
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4349
Undeveloped Runoff Coefficient (Cu)	0.3518
Developed Runoff Coefficient (Cd)	0.7881
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	0.5773
Burned Peak Flow Rate (cfs)	0.5773
24-Hr Clear Runoff Volume (ac-ft)	0.1133
24-Hr Clear Runoff Volume (cu-ft)	4934.6194



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;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           01/01/2017
START_TIME           00:00:00
REPORT_START_DATE    01/01/2017
REPORT_START_TIME    00:00:00
END_DATE             01/10/2017
END_TIME             06:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:10:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:00:30
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.566
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1
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[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          0.03   0.0479 0.0719 0.102  0.132  0.156  0.168  0.15   0.114  0.0781 0.042  0.03
DRY_ONLY         NO

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
B                0          0          0          0          0
B_Bypass         10         0          0          0          0
B_Overflow       3          900        0          0          0
B_to_River       2          0          0          0          0
C                0          0          0          0          0
C_Bypass         10         0          0          0          0
C_Overflow       3          900        0          0          0
C_to_River       2          0          0          0          0
C_Treated        0          0          0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
River            0          FREE                        NO
C_Infil          0          FREE                        NO
B_Infil          0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
WQ_B             20         15               CUTOFF     20.34      0          0          0          0
WQ_C             20         13               CUTOFF     7.70       0          0          0          0

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi
Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------
RegFac_B         5        25         0          TABULAR    B_Storage                    0        0
RegFac_C         5        25         0          TABULAR    C_Storage                    0        0
```

```
[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- --------
7                WQ_C             RegFac_C         25         0.01       0          0          0          0
8                WQ_B             RegFac_B         25         0.01       0          0          0          0
10               C_Overflow       C_Bypass         25         0.01       0          0          0          0
12               B                WQ_B             400        0.01       0          0          0          0
13               WQ_C             C_Bypass         25         0.01       0          0          0          0
14               C_Bypass         C_to_River       25         0.01       0          0          0          0
15               WQ_B             B_Bypass         25         0.01       0          0          0          0
16               C                WQ_C             400        0.01       0          0          0          0
17               B_Overflow       B_Bypass         25         0.01       0          0          0          0
29               B_Bypass         B_to_River       25         0.01       0          0          0          0
31               B_to_River       River            25         0.01       0          0          0          0
32               C_to_River       River            25         0.01       0          0          0          0
38               C_Treated        C_to_River       400        0.01       0          0          0          0

[ORIFICES]
;;Name           From Node        To Node          Type         Offset     Qcoeff     Gated    CloseTime
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- ----------
C_Treated        RegFac_C         C_Treated        SIDE         2.25       0.65       NO       0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated    EndCon   EndCoeff
Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- ---------------- ---------------- ------------ ---------- ---------- -------- -------- ----------
B_Overflow       RegFac_B         B_Overflow       TRANSVERSE   6.1        3.33       NO       0        0      YES
C_Overflow       RegFac_C         C_Overflow       TRANSVERSE   7.75       3.33       NO       0        0      YES

[OUTLETS]
;;Name           From Node        To Node          Offset     Type               QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- ---------------- ---------------- ---------- --------
B_Infil          RegFac_B         B_Infil          0          TABULAR/DEPTH    B_Infil                     NO
C_Infil          RegFac_C         C_Infil          0          TABULAR/DEPTH    C_Infil                     NO

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
7                DUMMY        0                0          0          0          1
8                DUMMY        0                0          0          0          1
10               DUMMY        0                0          0          0          1
12               DUMMY        0                0          0          0          1
```

Design total depths of Regional Facilities B and C

```
13              DUMMY        0               0          0          0          1
14              DUMMY        0               0          0          0          1
15              DUMMY        0               0          0          0          1
16              DUMMY        0               0          0          0          1
17              DUMMY        0               0          0          0          1
29              DUMMY        0               0          0          0          1
31              DUMMY        0               0          0          0          1
32              DUMMY        0               0          0          0          1
38              DUMMY        0               0          0          0          1
C_Treated       CIRCULAR     0.33            0          0          0
B_Overflow      RECT_OPEN    100             12         0          0
C_Overflow      RECT_OPEN    100             12         0          0

[INFLOWS]
;;Node           Constituent      Time Series      Type     Mfactor  Sfactor  Baseline Pattern
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
B               FLOW             B_Series         FLOW     1.0      1
C               FLOW             C_Series         FLOW     1.0      1.5


[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
B_Infil         Rating     0          1.80
B_Infil                    1          1.94
B_Infil                    2          2.08
B_Infil                    3          2.23
B_Infil                    4          2.38
B_Infil                    5          2.54
B_Infil                    6          2.72
B_Infil                    6.5        2.82
B_Infil                    7          2.92
;
C_Infil         Rating     0          0.0
C_Infil                    2.75       0.0
C_Infil                    2.76       0.0
C_Infil                    4.75       0.0
C_Infil                    4.76       0.0
C_Infil                    5.75       0.0
C_Infil                    6.75       0.0
C_Infil                    7.75       0.0
;
```

```
B_Storage        Storage    0          25987
B_Storage                   1          27945
B_Storage                   2          29973
B_Storage                   3          32063
B_Storage                   4          34209
B_Storage                   5          36619
B_Storage                   6          39156
B_Storage                   7          42006
B_Storage                   8          45127
B_Storage                   9          48619
;
C_Storage        Storage    0          2494
C_Storage                   2.75       2494
C_Storage                   2.76       1559
C_Storage                   4.75       1559
C_Storage                   4.76       6235
C_Storage                   5.76       7432
C_Storage                   6.76       8713
C_Storage                   7.76       10108
C_Storage                   8.76       11647
C_Storage                   9.76       13242
C_Storage                   10.76      15651
```

Storage curves: Regional Facilities B and C

```
[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
[HYDROCALC OUTPUT TIMESERIES - BASIN B]
[HYDROCALC OUTPUT TIMESERIES - BASIN C]

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -130.293 4579.247 12395.702 13681.120
Units      None
```

```
[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
B                6239.557           7833.385
B_Bypass         7712.688           11286.647
B_Overflow       7840.795           10873.859
B_to_River       9534.651           12610.417
C                9950.246           9154.468
C_Bypass         10815.719          11984.118
C_Overflow       10232.121          11457.456
C_to_River       10602.207          12695.822
C_Treated        9961.673           11941.415
River            10532.017          13225.220
C_Infil          8736.015           9688.730
B_Infil          8056.046           9552.736
WQ_B             6705.821           8678.490
WQ_C             9979.387           9659.588
RegFac_B         8104.615           10067.570
RegFac_C         8833.154           10271.560

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------


***********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
***********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ NO
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... KINWAVE
Starting Date ............ 01/01/2017 00:00:00
Ending Date .............. 01/10/2017 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:10:00
Routing Time Step ........ 30.00 sec


*************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.000         0.000
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         5.334         1.738
External Outflow .........         5.182         1.688
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.129         0.042
```

Continuity Error (%) 0.441

****
Highest Flow Instability Indexes
****
Link B_Infil (-3)

****
Routing Time Step Summary
****
Minimum Time Step : 30.00 sec
Average Time Step : 30.00 sec
Maximum Time Step : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 1.00
Percent Not Converging : 0.00

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
B	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
B_Bypass	JUNCTION	0.00	0.00	10.00	0 00:00	0.00
B_Overflow	JUNCTION	0.00	0.00	3.00	0 00:00	0.00
B_to_River	JUNCTION	0.00	0.00	2.00	0 00:00	0.00
C	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
C_Bypass	JUNCTION	0.00	0.00	10.00	0 00:00	0.00
C_Overflow	JUNCTION	0.00	0.00	3.00	0 00:00	0.00
C_to_River	JUNCTION	0.00	0.00	2.00	0 00:00	0.00
C_Treated	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
River	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
C_Infil	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
B_Infil	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
WQ_B	DIVIDER	0.00	0.00	20.00	0 00:00	0.00
WQ_C	DIVIDER	0.00	0.00	20.00	0 00:00	0.00
RegFac_B	STORAGE	0.05	1.52	6.52	0 20:28	1.52
RegFac_C	STORAGE	2.50	6.63	11.63	0 20:04	6.63

The maximum depths in Regional Facilities B and C during the storm event are lower than the design total depths of:

- B: 6.1 feet
- C: 7.75 feet (3 ft ponding)

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent	
B	JUNCTION	20.31	20.31	0 19:15	1.27	1.27	0.000	
B_Bypass	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
B_Overflow	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
B_to_River	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
C	JUNCTION	7.70	7.70	0 19:15	0.473	0.473	0.000	
C_Bypass	JUNCTION	0.00	0.00	0 19:15	0	7.47e-07	0.000	gal
C_Overflow	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
C_to_River	JUNCTION	0.00	0.92	0 20:04	0	0.431	0.000	
C_Treated	JUNCTION	0.00	0.92	0 20:04	0	0.431	0.000	
River	OUTFALL	0.00	0.92	0 20:04	0	0.431	0.000	
C_Infil	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	
B_Infil	OUTFALL	0.00	2.01	0 20:28	0	1.26	0.000	
WQ_B	DIVIDER	0.00	20.31	0 19:15	0	1.27	0.000	
WQ_C	DIVIDER	0.00	7.70	0 19:15	0	0.473	0.000	
RegFac_B	STORAGE	0.00	20.31	0 19:15	0	1.27	0.611	
RegFac_C	STORAGE	0.00	7.70	0 19:15	0	0.473	-0.003	

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS

RegFac_B	1.359	0.1	0	0	41.829	2.7	0	20:28	2.01
RegFac_C	6.316	1.2	0	0	23.805	4.4	0	20:04	0.92

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
River	16.85	0.43	0.92	0.431
C_Infil	0.00	0.00	0.00	0.000
B_Infil	11.74	1.79	2.01	1.258
System	9.53	2.22	2.93	1.688

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
7	DUMMY	7.70	0	19:15			
8	DUMMY	20.31	0	19:15			
10	DUMMY	0.00	0	00:00			
12	DUMMY	20.31	0	19:15			
13	DUMMY	0.00	0	19:15			
14	DUMMY	0.00	0	19:15			
15	DUMMY	0.00	0	00:00			
16	DUMMY	7.70	0	19:15			
17	DUMMY	0.00	0	00:00			
29	DUMMY	0.00	0	00:00			
31	DUMMY	0.00	0	00:00			
32	DUMMY	0.92	0	20:04			
38	DUMMY	0.92	0	20:04			
C_Treated	ORIFICE	0.92	0	20:04			0.00
B_Overflow	WEIR	0.00	0	00:00			0.00

C_Overflow	WEIR	0.00	0	00:00	0.00
B_Infil	DUMMY	2.01	0	20:28	
C_Infil	DUMMY	0.00	0	00:00	

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Fri Nov 1 11:11:59 2024
Analysis ended on: Fri Nov 1 11:12:00 2024
Total elapsed time: 00:00:01

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           01/01/2017
START_TIME           00:00:00
REPORT_START_DATE    01/01/2017
REPORT_START_TIME    00:00:00
END_DATE             01/05/2017
END_TIME             06:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:10:00
WET_STEP             00:15:00
DRY_STEP             04:00:00
ROUTING_STEP         0:00:30
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.566
MAX_TRIALS           8
HEAD_TOLERANCE       0.005
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
```

```
;;-------------- ----------------
MONTHLY          0.03   0.0479 0.0719 0.102  0.132  0.156  0.168  0.15   0.114  0.0781 0.042  0.03
DRY_ONLY         NO

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
D_Overflow       3          900        0          0          0
D_to_River       2          0          0          0          0
D_Treated        3          900        0          0          0
D1_Bypass        10         0          0          0          0
ES_Bypass        10         0          0          0          0
MV_Bypass        10         0          0          0          0
WQ_D_D1          25         0          0          0          0
WQ_D_ES          25         0          0          0          0
WQ_D_MV          25         0          0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
River            0          FREE                        NO

[DIVIDERS]
;;Name           Elevation  Diverted Link    Type       Parameters
;;-------------- ---------- ---------------- ---------- ----------
D1_Div           20         19               CUTOFF     16.8       0          0          0          0
ES_Div           20         ES_Bypass        CUTOFF     36.75      0          0          0          0
MV_Div           20         1                CUTOFF     40.6       0          0          0          0

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            N/A      Fevap    Psi
Ksat     IMD
;;-------------- -------- ---------- ---------- ---------- ---------------------------- -------- --------
RegFacD          5        25         0          TABULAR    D_Storage                    0        0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- --------
--
3                D_Overflow       D_to_River       25         0.01       0          0          0          0
4                D_Treated        D_to_River       25         0.01       0          0          0          0
ES_Direct_to_D   ES_Div           RegFacD          25         0.01       0          0          0          0
D1_Direct_to_D   D1_Div           RegFacD          25         0.01       0          0          0          0
```

```
19              D1_Div          D1_Bypass       25          0.01        0           0           0           0
20              D1_Bypass       River           25          0.01        0           0           0           0
22              D_to_River      River           25          0.01        0           0           0           0
ES_Bypass       ES_Div          ES_Bypass       25          0.01        0           0           0           0
24              MV_Bypass       River           25          0.01        0           0           0           0
1               MV_Div          MV_Bypass       25          0.01        0           0           0           0
MV_Direct_to_D  MV_Div          RegFacD         25          0.01        0           0           0           0
2               ES_Bypass       River           25          0.01        0           0           0           0
5               WQ_D_D1         D1_Div          25          0.01        0           0           0           0
6               WQ_D_MV         MV_Div          25          0.01        0           0           0           0
7               WQ_D_ES         ES_Div          25          0.01        0           0           0           0

[ORIFICES]
;;Name           From Node       To Node         Type         Offset     Qcoeff     Gated    CloseTime
;;-------------- --------------- --------------- ------------ ---------- ---------- -------- -------
D_Treated       RegFacD         D_Treated       SIDE         0          0.61       NO       0

[WEIRS]
;;Name           From Node       To Node         Type         CrestHt    Qcoeff     Gated    EndCon    EndCoeff
Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- --------------- --------------- ------------ ---------- ---------- -------- --------- ----------
D_Overflow      RegFacD         D_Overflow      TRANSVERSE   9.75       3.33       NO       0         0          YES

[XSECTIONS]
;;Link           Shape        Geom1           Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ --------------- ---------- ---------- ---------- ---------- ----------
3               DUMMY        0               0          0          0          1
4               DUMMY        0               0          0          0          1
ES_Direct_to_D  DUMMY        0               0          0          0          1
D1_Direct_to_D  DUMMY        0               0          0          0          1
19              DUMMY        0               0          0          0          1
20              DUMMY        0               0          0          0          1
22              DUMMY        0               0          0          0          1
ES_Bypass       DUMMY        0               0          0          0          1
24              DUMMY        0               0          0          0          1
1               DUMMY        0               0          0          0          1
MV_Direct_to_D  DUMMY        0               0          0          0          1
2               DUMMY        0               0          0          0          1
5               DUMMY        0               0          0          0          1
6               DUMMY        0               0          0          0          1
7               DUMMY        0               0          0          0          1
D_Treated       CIRCULAR     1.25            0          0          0
D_Overflow      RECT_OPEN    100             12         0          0
```

Design total depth of MV Regional Facility D

```
[INFLOWS]
;;Node           Constituent      Time Series      Type     Mfactor  Sfactor  Baseline Pattern
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
WQ_D_D1          FLOW             D1_Series        FLOW     1.0      1.5
WQ_D_ES          FLOW             ES_Series        FLOW     1.0      1.5
WQ_D_MV          FLOW             MV_Series        FLOW     1.0      1.5

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
D_Storage        Storage    0          53248
D_Storage                   2.5        53248
D_Storage                   2.75       53248
D_Storage                   2.76       33280
D_Storage                   4.75       33280
D_Storage                   4.76       133120
D_Storage                   5.75       137986
D_Storage                   6.75       142949
D_Storage                   7.75       147953
D_Storage                   8.75       153029
D_Storage                   9.75       158264
D_Storage                   10.75      163389

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
[HYDROCALC OUTPUT TIMESERIES - BASIN D-D1]
[HYDROCALC OUTPUT TIMESERIES - BASIN D-ES]
[HYDROCALC OUTPUT TIMESERIES - BASIN D-MV]

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS 0.000 0.000 10000.000 10000.000
Units      None
```

Storage curve: MV Regional Facility D

```
[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
D_Overflow       677.695            3991.462
D_to_River       -1318.036          2700.107
D_Treated        -304.162           4493.063
D1_Bypass        1339.381           3372.465
ES_Bypass        2449.306           3148.346
MV_Bypass        -1147.279          4717.182
WQ_D_D1          2033.084           4322.305
WQ_D_ES          4767.442           4959.302
WQ_D_MV          805.763            7022.412
River            -2203.842          1824.973
D1_Div           1787.620           4738.527
ES_Div           3281.750           4663.821
MV_Div           464.248            6371.398
RegFacD          1275.347           5699.039

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------


***********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
***********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ NO
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Flow Routing Method ...... KINWAVE
Starting Date ............ 01/01/2017 00:00:00
Ending Date .............. 01/05/2017 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:10:00
Routing Time Step ........ 30.00 sec


*************************        Volume         Volume
Flow Routing Continuity        acre-feet      10^6 gal
*************************     ---------      ---------
Dry Weather Inflow .......         0.000          0.000
Wet Weather Inflow .......         0.000          0.000
Groundwater Inflow .......         0.000          0.000
RDII Inflow ..............         0.000          0.000
External Inflow ..........        26.670          8.691
External Outflow .........        26.654          8.686
Flooding Loss ............         0.000          0.000
Evaporation Loss .........         0.000          0.000
Exfiltration Loss ........         0.000          0.000
Initial Stored Volume ....         0.000          0.000
```

```
Final Stored Volume ......          0.016          0.005
Continuity Error (%) .....         -0.001
```

```
*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.
```

```
*************************
Routing Time Step Summary
*************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00
```

```
******************
Node Depth Summary
******************
```

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
D_Overflow	JUNCTION	0.00	0.00	3.00	0 00:00	0.00
D_to_River	JUNCTION	0.00	0.00	2.00	0 00:00	0.00
D_Treated	JUNCTION	0.00	0.00	3.00	0 00:00	0.00
D1_Bypass	JUNCTION	0.00	0.00	10.00	0 00:00	0.00
ES_Bypass	JUNCTION	0.00	0.00	10.00	0 00:00	0.00
MV_Bypass	JUNCTION	0.00	0.00	10.00	0 00:00	0.00
WQ_D_D1	JUNCTION	0.00	0.00	25.00	0 00:00	0.00
WQ_D_ES	JUNCTION	0.00	0.00	25.00	0 00:00	0.00
WQ_D_MV	JUNCTION	0.00	0.00	25.00	0 00:00	0.00
River	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
D1_Div	DIVIDER	0.00	0.00	20.00	0 00:00	0.00
ES_Div	DIVIDER	0.00	0.00	20.00	0 00:00	0.00
MV_Div	DIVIDER	0.00	0.00	20.00	0 00:00	0.00
RegFacD	STORAGE	1.18	6.54	11.54	0 20:29	6.54

The maximum depth in Regional Facility D during the storm event is lower than the design total depth of 9.75 feet (5 ft ponding)

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent	
D_Overflow	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
D_to_River	JUNCTION	0.00	14.61	0 20:29	0	8.69	0.000	
D_Treated	JUNCTION	0.00	14.61	0 20:29	0	8.69	0.000	
D1_Bypass	JUNCTION	0.00	0.04	0 19:21	0	6.14e-05	0.000	
ES_Bypass	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
MV_Bypass	JUNCTION	0.00	0.00	0 00:00	0	0	0.000	gal
WQ_D_D1	JUNCTION	16.84	16.84	0 19:21	2.09	2.09	0.000	
WQ_D_ES	JUNCTION	40.34	40.34	0 19:16	3.27	3.27	0.000	
WQ_D_MV	JUNCTION	40.58	40.58	0 19:16	3.33	3.33	0.000	
River	OUTFALL	0.00	14.61	0 20:29	0	8.69	0.000	
D1_Div	DIVIDER	0.00	16.84	0 19:21	0	2.09	0.000	
ES_Div	DIVIDER	0.00	40.34	0 19:16	0	3.27	0.000	
MV_Div	DIVIDER	0.00	40.58	0 19:16	0	3.33	0.000	
RegFacD	STORAGE	0.00	97.56	0 19:16	0	8.69	-0.001	

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
RegFacD	66.799	2	0	0	459.206	12	0 20:28	14.61

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
River	99.91	3.16	14.61	8.685
System	99.91	3.16	14.61	8.685

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days	hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
3	DUMMY	0.00	0	00:00			
4	DUMMY	14.61	0	20:29			
ES_Direct_to_D	DUMMY	40.34	0	19:16			
D1_Direct_to_D	DUMMY	16.80	0	19:19			
19	DUMMY	0.04	0	19:21			
20	DUMMY	0.04	0	19:21			
22	DUMMY	14.61	0	20:29			
ES_Bypass	DUMMY	0.00	0	00:00			
24	DUMMY	0.00	0	00:00			
1	DUMMY	0.00	0	00:00			
MV_Direct_to_D	DUMMY	40.58	0	19:16			
2	DUMMY	0.00	0	00:00			
5	DUMMY	16.84	0	19:21			
6	DUMMY	40.58	0	19:16			
7	DUMMY	40.34	0	19:16			
D_Treated	ORIFICE	14.61	0	20:29			0.00
D_Overflow	WEIR	0.00	0	00:00			0.00

****
Conduit Surcharge Summary

****

No conduits were surcharged.

Analysis begun on: Mon Dec 12 09:25:19 2022
Analysis ended on: Mon Dec 12 09:25:19 2022
Total elapsed time: < 1 sec

ENTRADA SOUTH DRAINAGE CHANNEL ANALYSIS

Volume IV

County of Los Angeles

Prepared for:

Newhall Land and Farming
25124 Springfield Court Suite 300
Valencia, CA 91355

Prepared by:

PACE ADVANCED WATER ENGINEERING

DATED:
02/22/2024

Technical Memorandum

Date: February 22, 2024

To: Alex Herrell; Five Point-Newhall Ranch

Cc: Jason Fukumitsu, PE; Hunsaker & Associates

From: Jose Cruz, PE
Cherise Thompson, EIT

Re: Entrada South Unnamed Canyon 2 – Equilibrium Slope Analysis # A373

Introduction

The purpose of this technical memorandum is to provide a summary of the hydraulic design of the Unnamed Canyon 2 drainage channel, which is part of the Entrada South development in Santa Clarita, California. In existing conditions, flow enters the channel from the neighboring Westridge golf course to the south, through an existing 36-inch storm drain pipe, as well as overland flow during larger storm events. The drainage channel is approximately 2,500 linear feet in length and flows from the south to the north. On the north end of the channel, flow enters an existing culvert at Magic Mountain Parkway before discharging to the Santa Clara River.

As part of the Entrada South development plan, the existing outlet structure at the upstream end of the channel will be partially demolished and replaced by small basin that will route flows to a bypass storm drain. From the bypass storm drain, smaller flows (average annual flows, equivalent to the 1 to 2-yr historic flow events) will be routed to the Unnamed Canyon 2 drainage channel via a low-flow diversion. The Unnamed Canyon 2 drainage channel will convey the flow to a proposed debris basin at the downstream end of the project reach (Debris Basin #7). During larger storm events, a majority of the flow entering the storm drain will bypass the low flow diversion and flow directly to the downstream debris basin. While peak flow rates in the Unnamed Canyon 2 drainage channel will be significantly reduced from existing conditions, the channel is designed to continue to convey smaller flow rates in order to sustain vegetation in the channel. Portions of the channel are under U.S. Army Corps of Engineers/California Department of Fish and Wildlife (USACE/CDFW) jurisdiction, shown on **Figure 1**. The proposed channel will be completely re-graded, and grade control structures will be installed in order to protect against lateral and vertical erosion. The channel banks will be engineered slopes that will support the adjacent access roads and trails that are proposed to be constructed parallel to the channel.

The drainage channel will be bisected by the proposed “A Street” alignment, beneath which a culvert will be installed, for flow conveyance.

Hydrology

A Modified Rational Method hydrology analysis was performed by Hunsaker and Associates (ESTU# 2022000056), which provided flow rates tributary to the Unnamed Canyon 2 drainage channel. The hydrology was performed for a 50-yr storm event; however, a majority of the runoff from the tributary watersheds is proposed to be diverted away from the Unnamed Canyon II channel and into a proposed storm drain. A fraction of the flow is designed to continue down the Unnamed Canyon II channel through a diversion in the proposed storm drain. The amount of diverted flow was determined by Dudek, the environmental consultant for the project, based on the minimum flow required to support vegetation / habitat in the channel (13 cfs). Incremental increases in flow rate occur throughout the channel reach, originating from local sub-watersheds. The incremental increases are based on the aforementioned 50-yr hydrology; however, the increases are minor and the total cumulative flow at the downstream terminus of the channel is relatively small (37.5 cfs). The design flow rates during a 50-yr storm, shown in **Table 1**, are significantly smaller than in the pre-development condition. A local drainage map exhibit with key node locations can be found in **Enclosure 3** included with this memo. Additionally, a project-wide hydrology drainage concept map has been provided in **Enclosure 5**, which provides greater context for the Unnamed Canyon II channel in relation to the project at-large. It should be noted that the flow rates in **Enclosure 3** are slightly different from those presented in this report (25.1 cfs at Reach 3 vs. 21.7; 33.7 cfs at Reach 2 vs. 21.7; 37.4 cfs at Reach 1 vs. 37.5). These differences are extremely minor and would not change the results of the analysis or conclusions presented herein. The differences in flow rate are due to ongoing and minor changes to the drainage area as the project approaches final design. During the final design phases, if there are additional changes to the site design, all changes will be incorporated into the analysis presented herein.

Table 1: Hydrology Data

Reach	Description of Reach	HEC-RAS Sections	Flow Rate (cfs)
Reach 1	From Node D to Node C on drainage map exhibit (see Enclosures)	STA 1447.98 to STA 2320.35	37.5
Reach 2	From Node C to Node B on drainage map exhibit (see Enclosures)	STA 2320.35 to STA 3440.63	33.8
Reach 3	From Node B to Node A on drainage map exhibit (see Enclosures)	STA 3440.63 to STA 3895.84	21.7
Inlet	Flow diverted from the proposed storm drain to the Unnamed Canyon II channel	U/S Conditions	13.0

The flow rates shown in **Table 1** were applied the hydraulic models and subsequent equilibrium slope analysis discussed in this memo. Reaches were delineated based on the locations of flow changes indicated in the data provided by Hunsaker.

Preliminary Hydraulic Model Preparation

PACE prepared one-dimensional (1D) hydraulic models using HEC-RAS Version 6.1.0. A preliminary set of models were run using existing conditions channel geometry as a base, in order to provide a realistic estimate of the Unnamed Canyon 2 drainage channel's equilibrium slope. The preliminary equilibrium slope results were used to inform the design of the proposed channel slope. The hydraulic results from the proposed conditions channel geometry were used to re-calculate the equilibrium slope in post-project conditions and verify the results produced by the preliminary analysis.

Two preliminary hydraulic models were created: one representing pre-project grading conditions with post-project flows, and one representing pre-project grading conditions where a self-forming channel has formed, also with post-project flows. It was determined that using pre-project condition flow rates would not produce useful results, since there is no future condition where the full 50-year flow is routed through the channel. Each of the HEC-RAS models developed for this analysis are described herein:

"EX – Unnamed Canyon 2" HEC-RAS Model (Plan 01) represents the channel with sides reflecting post-development grading conditions (banks only), while the invert reflects the pre-development gradient. Additionally, this plan utilizes post-project flows, which are significantly reduced from the existing condition due to the diversion at the upstream end. A composite of the 2011 topographic data and the proposed grading plan was used to cut the sections of this plan. This plan was used to predict what slope the channel would stabilize at (i.e. reach equilibrium). Equilibrium slope calculations were performed using the results of this model; however, it was noted that the flow depths in the existing geometry cross-sections were extremely shallow. In many documented cases, flow that is spread out over a wide area and a shallow depth will carve out a low-flow path where the water travels in a more concentrated and energy-efficient manner toward its downstream destination. For this reason, another model was created, using existing geometry, where a self-forming channel has formed.

"EX – Unnamed Canyon 2 – Self-Form" HEC-RAS Model (Plan 02) is the same geometric configuration as Plan 01, with exception to a self-forming channel, which has formed. Equilibrium slope calculations were also performed using the results of this model. The parameters used to create the self-forming channel in this model are described in the section titled **"***Self-Forming Channel Parameters***"** herein.

Two additional hydraulic models (Plans 03 and 04) were prepared, where the channel invert was graded to the predicted stable slope of Plans 01 and 02, in order to verify the channel slope would not degrade in post-project grading conditions. Plans 02 and 03 are described the section titled "**Proposed Grading Condition Hydraulic Model**" herein.

Structures

No structures exist in existing conditions in the Unnamed Canyon 2 drainage channel, so none were included in the preliminary hydraulic modeling.

Manning's Roughness Coefficients

A uniform Manning's roughness coefficient was applied to both preliminary models, which was selected from Chow's summary of Manning's roughness values. The Unnamed Canyon 2 channel can be categorized most accurately under Chow's "Main Channels – straight, full stage, no rifts or deep pools – some stones and weeds", where "minimum" Manning's value is 0.03, "normal" is 0.035, and "maximum" is 0.040. For this analysis, the minimum Manning's value from this range was selected – 0.03.

Boundary Conditions

The preliminary hydraulic models were run using the mixed flow regime. Therefore, a boundary condition was required at both upstream and downstream ends. In the Existing (Plan 01) and Existing - Self-Form (Plan 02) channel conditions, normal depth was used as the boundary condition input. The pre-development natural channel continues uninterrupted at the downstream end of Reach 1, absent of any structures or basin-type features.

The slopes used for each model were identical, as they were both determined using 2011 Newhall Ranch topographic data (See **Table 2**).

Table 2: Normal Depth Boundary Conditions – Plan 01 & 02

Plan	Upstream Boundary Condition	Downstream Boundary Condition
Existing	0.009	0.023
Existing Self-Form	0.009	0.023

Cross-Section Spacing

The preliminary models contain 48 sections, with average spacing of 60 feet. The total length of the modeled channel is approximately 2,500 feet. Cross-sections were placed at key locations in the channel where changes to the geometry occur, such as contractions, expansions, bends, and at grade breaks in the invert. Cross sections were cut from 2011 Newhall Ranch topographic data. The geometric changes made to the self-forming channel model sections are described below.

Self-Forming Channel Parameters

"Channel-forming flows" or "dominant discharge flows" describe a condition where a small amount of flow carves an efficient flow path through a wide channel section (a.k.a self-forming channel). These flows are typically not associated with storm events used to evaluate flood risk (i.e. 100-yr or Capital Flood). There is some variation in research as to what exact storm event qualifies as a "channel forming flow", but generally, they fall between a recurrence interval of 1 to 10 years. "Channel-forming flows" will alter a channel until it reaches equilibrium. In existing conditions, a meandering self-forming channel has been observed within the Unnamed Canyon II drainage channel and it is assumed the proposed condition will be similar, considering how the channel will regularly convey flows significantly smaller than the pre-development 50-yr event.

The self-forming channel was assumed to have a rectangular shape with a width that was determined using the Dawdy Equation. The Dawdy Equation (Dawdy, 1979) is used in the FEMA approach to identifying regulatory flood hazards on an active alluvial fan. Namely, in the single channel region of the fan, the width and depth of the self-forming channel can be defined as a function of the discharge; and the flow in these channels occurs at critical depth. The width of the self-forming channel is defined as the point where the derivative of the width with respect to the depth is (-200). Given this assumption, the width of the self-forming channel is:

$$W = 9.4Q^{0.4}$$

where,

$W = \text{width of the self-forming channel (ft)}$
$Q = \text{flow (cfs)}$

The depth of the self-forming channel was determined by back-calculating the height of flow in the rectangular self-forming channel using Manning's equation. These dimensions were used to incorporate the self-forming channel into the HEC-RAS model while maintaining the channel's existing longitudinal slope.

Hydraulic Results

The hydraulic results summarized in **Tables 3 and 4** were used to perform the equilibrium slope analysis. The results are averaged by reach, which were defined by locations where the flow rate changes in the channel. The average excludes sections at drop structure tops, slopes, or toes, since those sections exhibit depths and velocities that don't conform with the average channel characteristics.

Table 3: HEC-RAS Results for Plan 01

Hydraulic Parameter	Reach 1	Reach 2	Reach 3
Flow Rate (cfs)	37.5	33.8	21.7
Average Channel Depth (ft)	0.6	0.4	0.7
Average Velocity (ft/s)	4.04	2.79	3.19
Average Top Width (ft)	37	75	25
Average Froude Number	1.15	1.16	1.15
Average Energy Slope (ft/ft)	0.027	0.035	0.053

Table 4: HEC-RAS Results for Plan 02

Hydraulic Parameter	Reach 1	Reach 2	Reach 3
Flow Rate (cfs)	37.5	33.8	21.7
Average Channel Depth (ft)	0.3	0.3	0.4
Average Velocity (ft/s)	3.13	3.22	2.84
Average Top Width (ft)	46	39	32
Average Froude Number	1.06	1.10	1.09
Average Energy Slope (ft/ft)	0.025	0.028	0.034

Preliminary Equilibrium Slope Analysis

In most alluvial channels, a stable channel slope is achieved when the supply of sediment and the sediment transport capacity of the channel are balanced, or in equilibrium. For Unnamed Canyon 2, the sediment supply has been significantly reduced over time, due to the development of the areas upstream of the project. As a result, the natural channel has experienced considerable erosion and has transformed from a braided stream with multiple threaded channels to a severely incised and widened channel (Geosyntec, 2013).

The equilibrium slope was calculated using a variety of methods including (1) the Incipient Motion Equation from HEC-20 (**Eqn. 6.17**) (2) the Meyer-Peter Muller Equation from HEC-20 (**Eqn. 6.18**), and (3) methodology outlined in the Albuquerque Metropolitan Arroyo Flood Control Agency (AMAFCA) Sediment and Erosion Design Guide.

Sediment Data

PACE used sediment data obtained from the particle size distribution test report prepared by ENGEO in 2021. Two sample points were taken in the streambed and were filtered out to only include particles 3" in diameter or smaller. This prevented larger, superficial grain sizes from skewing the data. Per ENGEO's observation, it is normal for the sediment in alluvial channels to vary in size over a very short distance and to have over-bank deposits consisting of fine-grained silts and clays. The particle size distribution data from the two sample points were averaged and used for the equilibrium slope calculations of the entire channel.

HEC-20 Incipient Motion Equation

Methodology outlined in Hydraulic Engineering Circular No. 20 (HEC-20) was used to estimate the equilibrium slope of the drainage channel at Unnamed Canyon 2. For clear-water releases of flow from dams, detention ponds, or other retention structures, there is no sediment supply delivered to the channel from upstream reaches. Such is the case with the Unnamed Canyon 2 channel, which is preceded by Debris Basin #5. In this case, the channel would be expected to degrade until the reduction in slope results in a boundary shear stress too low to entrain the bed material. In a sand bed channel, such as Unnamed Canyon 2, the channel slope would have to be extremely low to reach incipient motion conditions and the amount of degradation could be significant. Depending on the bed and bank materials, the degrading channel can narrow as it deepens or the banks can become unstable and the channel can widen. Channel widening temporarily replenishes sediment supply. **Equation 6.17** from HEC-20 assumes the channel width remains constant for future conditions.

Equation 6.17 combines the Incipient Motion Relationship (Equation 6.13) and Manning's Equation (Equation 3.3) to calculate the equilibrium slope where bed material movement ceases.

The Incipient Motion Relationship describes the condition where the hydraulic forces acting on a sediment particle are equal to the forces resisting motion. The particle is at a critical condition where a slight increase in the hydraulic forces will cause the particle to move. The hydraulic forces consist of lift and drag and are usually represented in a simplified form by the shear stress of the flow acting on the particle. Incipient motion conditions can be analyzed using the Shields diagram. The Incipient Motion Relationship can be used to calculate a sediment particle size that will move for a particular hydraulic condition or to calculate the shear stress required to move a particular particle size. The average shear stress acting on the channel includes all the factors contributing to resistance of flow.

The Manning's Equation recognizes that flow rate is a function of gravitational forces on water in a sloping channel and the resistance produced by friction between the water and wetted surface of the channel. Manning's Equation can be used to determine the velocity and discharge of flow under steady, uniform conditions in open channels.

The Incipient Motion Relationship and Manning's equation are combined to produce the following equation:

$$S_{eq} = \left[K_s D_c \left(\frac{\gamma_s - \gamma}{\gamma}\right)\right]^{10/7} \left(\frac{1.486}{q \times n}\right)^{6/7}$$ **Equation 6.17**

where,

S_{eq} = Equilibrium slope (ft/ft)
K_s = Shields Parameter (assumed to be 0.047)
D_c = Critical bed material size = D_{90} (ft)
γ_s = Specific weight of sediment (165.4 lb/ft^3)
γ = Specific weight of water (62.4 lb/ft^3)
q = Discharge per unit width (ft^2/s)
n = Manning's roughness coefficient

The critical size (D_C) used in this equation should be D_{90} because the bed will coarsen as degradation occurs.

The Shield's Parameter can range from 0.03 to 0.10 for natural sediments based on particle shape, angularity, gradation, and imbrication. The use of 0.047 for sand sizes provides reasonable results (Meyer-Peter and Muller 1948, Gessler 1971), while lower values (0.03) are commonly used for gravel and cobble sizes. The sediment observed in Unnamed Canyon 2 is sandy; therefore, the Shield's Parameter was assumed to be 0.047.

HEC-20 Meyer-Peter Muller Equation

Another approach described in HEC-20 is also used for determining the equilibrium slope of a channel with no upstream sediment supply. Equation 6.18 is presented by the USBR using the Meyer-Peter Muller equation for beginning of transport (USBR 1984). If adjustment of the hydraulic depth due to the reduction in channel slope is included in the equation, the USBR equation is:

$$S_{eq} = 60.1 \frac{(D_{50})^{10/7} n^{9/7}}{(D_{90})^{5/14} q^{6/7}}$$ **Equation 6.18**

where,

S_{eq} = Equilibrium slope (ft/ft)
n = Manning's roughness coefficient
q = Discharge per unit width (ft^2/s)
D_{50} = Median particle size (ft)
D_{90} = Particle diameter representing the 90% cumulative diameter (ft)

The stable slope computation is made for the "dominant discharge", which is defined as the flow affecting the ultimate shape and hydraulics of the channel. Unnamed Channel 2 is designed to accept a portion of the 50-yr flow from the proposed storm drain mainline. This diverted water is significantly smaller than the 50-yr pre-development flow, and can be accurately characterized as "dominant discharge". Therefore, the design flow rates for Unnamed Canyon 2 presented in the **Hydrology** section are appropriate for use in the calculation of equilibrium slope using **Equation 6.18**.

AMAFCA Method

A third method was considered, based on the equations provided in the Albuquerque Metropolitan Arroyo Flood Control Agency (AMAFCA) Sediment and Erosion Design Guide. Equations 3.59 and 3.60 from the AMAFCA Design Guide provide an estimate of the maximum stable channel slope in an alluvial channel when the sediment supply cannot be accurately estimated.

These equations were developed for cases where there is an unacceptable uncertainty in the estimated upstream bed material supply, and are based on the observation that stable alluvial channels rarely maintain supercritical flow for extended periods of time. High velocities associated with supercritical flow in sand-bed streams will result in extreme rates of bed material transport. The stream, reacting to this high transport capacity, will erode its bed and banks to a condition that will sustain transport rates consistent with the upstream supply. The typical Froude number range of a stable channel is between 0.7 and 1.0. A Froude number of 0.75 was selected for the present analysis, in order to evaluate the equilibrium slope. A Froude number of 0.75 reflects a condition where flow is sub-critical and stable. Froude numbers approaching 1.0 tend to be unstable and can produce widely varying results.

Using these assumptions, the maximum stable slope for a channel of given geometry and dominant discharge can be computed by combining the relationship for the Froude Number with a uniform flow formula. Using the wide rectangular channel assumption, which is valid for most arroyo channels, the following equations can be derived for stable channel slope:

$$S_{eq} = C \times Q^{-0.133} \qquad \textbf{Equation 3.59}$$

where,

S_{eq} = Equilibrium slope (ft/ft)
Q = Discharge (cfs)

$$C = 18.28 \times n^2 \times F^{0.133} \times F_r^{2.133} \qquad \textbf{Equation 3.60}$$

where,

Q = Discharge (cfs)
n = Manning's roughness coefficient
F = width to depth ratio of flow in channel (ft/ft)
Fr = Maximum Froude number (0.75)

The AMAFCA Design Guide states that the aforementioned equations can be used to obtain an initial approximation of the stable slope for use in locating grade control structures and bank protection measures.

Results of the Preliminary Equilibrium Slope Analysis

Table 5 shows the results of the three equilibrium slope methods for the pre-project channel conditions (with post-project flows).
Table 6 shows the results of the three methods for pre-project channel conditions where a self-forming channel has formed (with post-project flows).

Table 5: Equilibrium Slopes Calculated for Plan 01

Existing Geometry, Post-Project Flows			
	Incipient Motion (Eqn. 6-17)	Meyer-Peter Muller (Eqn. 6-18)	AMAFCA
Reach 1	0.023	0.005	0.010
Reach 2	0.051	0.011	0.011
Reach 3	0.035	0.007	0.010
Average	0.036	0.008	0.011

Table 6: Equilibrium Slopes Calculated for Plan 02

Existing Geometry, Self-Forming Channel, Post-Project Flows			
	Incipient Motion (Eqn. 6-17)	Meyer-Peter Muller (Eqn. 6-18)	AMAFCA
Reach 1	0.036	0.008	0.011
Reach 2	0.037	0.008	0.011
Reach 3	0.046	0.010	0.011
Average	0.039	0.008	0.011

The three equilibrium slope methods provide a range of slopes, which are averaged by method in the tables above. The Incipient Motion method generally produced the steepest slopes, 3.6 to 3.9%. The Meyer-Peter Muller method generally produced the smallest slopes, around 0.8%. The AMAFCA method produced results of a median value, around 1.1%. Based on the results of all three methods, a design slope of 1% was selected for the proposed channel. This slope is most in-line with the results from the AMAFCA method, and is a median value.

Proposed Grading Condition Hydraulic Model

PACE prepared two proposed grading conditions hydraulic models based on the preliminary equilibrium slope calculations. A uniform channel slope was used for both proposed models, set at the estimated equilibrium slope of 1%, which utilized the results of Plans 01 and 02. Grade control structures were intermittently placed along the channel length in order to make up the height deficit caused by the shallower slope. The hydraulic results from the proposed conditions models were then used to re-calculate the equilibrium slope in post-project conditions and to verify the results produced by the preliminary analysis. The proposed conditions HEC-RAS models developed for this analysis are described below:

"PR ND – Unnamed Canyon 2" HEC-RAS Model (Plan 03) represents post-project grading conditions, with post-project flows. The grading plan obtained from Hunsaker & Associates was combined with the 1% bed slope to cut sections for this model. Normal depth (ND) was used as the downstream boundary condition for this model, reflecting a design where the downstream culvert and basin do not restrict the flow rate in the channel. Further discussion of the downstream boundary condition is discussed in the section titled **"***Boundary Conditions***"** herein. Equilibrium slope calculations were performed using the results of Plan 03, in order to verify that the design slope selected, based on the preliminary analysis, was appropriate to use.

"PR WSE – Unnamed Canyon 2" HEC-RAS Model (Plan 04) is identical to Plan 03, with exception to the downstream boundary condition. A maximum water surface elevation (WSE) was determined as the downstream boundary condition of this model, reflective of a design where the downstream culvert and basin restrict the flow rate in the channel, to the point that the water surface reaches a maximum elevation (without infringing upon the required freeboard). Further discussion of the downstream boundary condition is discussed in the section titled "*Boundary Conditions*" herein. Equilibrium slope calculations were also performed on this model, in order to verify that the design slope selected, based on the preliminary analysis, was appropriate to use.

Structures

Only one bridge was included in the post-project conditions HEC-RAS models. The proposed development will include the "A Street" road crossing. A 4 ft. diameter culvert will be installed at the base of the road in order to convey flow from one side to the other. The culvert is located between HEC-RAS sections 2320.35 and 2119.93 and has a design slope of 5%.

The proposed drop structures were incorporated into the models using a series of tightly spaced cross sections along the top, slope, and toe of the drop. HEC-RAS guidance was used for the spacing of the sections and general drop structure modeling procedures.

Manning's Roughness Coefficient

For most sections, a uniform manning's coefficient of 0.03 was used, which is the same roughness coefficient used in the preliminary models. However, for sections located at grade control structures and the associated rock apron and invert lining, an increased manning's roughness coefficient of 0.04 was used.

Boundary Conditions

The proposed condition hydraulic models were run using the mixed flow regime. Therefore, a boundary condition was required at both upstream and downstream ends.

In the proposed condition, Debris Basin No.7 will be installed at the downstream end of Reach 1, introducing the potential for water to back up to a depth higher than normal depth. The final design of the pipe leading to Debris Basin No.7 and the surrounding grades will ultimately determine the downstream water surface elevation condition in the Unnamed Canyon 2 channel; however, these design details will be determined at during the final design phase of the project. Due to the uncertainty of the final design condition at the downstream end of the Unnamed Canyon 2 channel, two scenarios were run in the proposed condition hydraulic model: (1) Plan 03 utilizes normal depth as the downstream boundary condition, which produces the smallest flow depths and therefore highest velocities; (2) Plan 04 utilizes a maximum water surface elevation providing 2.5 ft. of freeboard as the downstream boundary condition, which produces the maximum flow depths and therefore lowest velocities.

The slope used for the Plan 03 downstream boundary condition were determined using the Hunsaker proposed grading plan. The maximum water surface elevation used for the Plan 04 downstream boundary condition was determined by subtracting 2.5 ft. of freeboard from the minimum top of bank elevation shown on the Hunsaker proposed grading plan (1180.0 ft. elev.). Boundary conditions used for each proposed condition plan are summarized in **Table 7**.

Table 7: Normal Depth Boundary Conditions – Plan 03

Plan	Upstream Boundary Condition	Downstream Boundary Condition
Proposed (Normal Depth)	S = 0.009	S = 0.010
Proposed (Max. Water Surface Elevation)	S = 0.009	WSE = 1177.5'

Cross-Section Spacing

The proposed condition models contain the same 48 cut cross-sections as the preliminary hydraulic models; however, a large number of sections were added to the proposed conditions models in the vicinity of grade control structures, through interpolation. For the areas immediately upstream of the grade control structure crest, immediately downstream of the crest, and immediately downstream of the toe, cross-sections were interpolated at 1-ft. intervals, in order to capture the rapidly varying water depth and velocity at these

locations. The total length of the modeled channel was unchanged from the preliminary hydraulic models, at approximately 2,500 feet. Cross sections were cut from a composite of 2011 Newhall Ranch topographic data and the Hunsaker grading plan.

Grade Control Structure Locations

The grade control structures were placed in locations that would reduce impacts to the USACE/CDFW jurisdictional areas to the maximum extent possible. **Figure 1** shows the grade control structures in relation to the USACE/CDFW jurisdictional boundary. Structures were most ideally placed in narrow portions of the channel, where the impact to the jurisdictional areas would be minimal. Due to the irregular spacing of the sections, the drop heights at each grade control structure also vary. However, all structures have several features in common: (1) slope of the grouted rock chute is 1:1, (2) grouted rock extends 5 feet upstream of the grade control structure crest, and (3) a loose rock apron extends 8 feet downstream of each grade control structure. **Figure 2** provides dimensions and layout of a typical structure.

Results of the Proposed Grading Condition Hydraulic Analysis

The HEC-RAS results for the proposed conditions models are shown in **Table 8 and 9**. Results are averaged by reach, which were delineated based on flow change locations.

Table 8: HEC-RAS Results from Plan 03

Hydraulic Parameter	Reach 1	Reach 2	Reach 3
Flow Rate (cfs)	37.5	33.8	21.7
Average Channel Depth (ft)	0.4	0.3	0.6
Average Velocity (ft/s)	3.21	2.35	2.86
Average Top Width (ft)	54	98	60
Average Froude Number	1.27	1.13	1.31
Average Energy Slope (ft/ft)	0.125	0.142	0.151

Table 9: HEC-RAS Results from Plan 04

Hydraulic Parameter	Reach 1	Reach 2	Reach 3
Flow Rate (cfs)	37.5	33.8	21.7
Average Channel Depth (ft)	0.9	0.4	0.8
Average Velocity (ft/s)	1.8	1.57	2.40
Average Top Width (ft)	63	104	31
Average Froude Number	0.56	0.59	0.73
Average Energy Slope (ft/ft)	0.008	0.009	0.012

Updated Equilibrium Slope Analysis Results

The hydraulic parameters obtained from the proposed conditions hydraulic models were used in the three equilibrium slope equations described in the section titled "**Preliminary Equilibrium Slope Analysis**" herein. The results from that analysis for the proposed conditions are shown in **Table 10 and 11**. These values demonstrate that the channel is not expected to degrade if graded at a 1% slope, regardless of downstream boundary condition. The results of all three methods applied show that the equilibrium slope will trend toward 1% at a minimum (aggradation). This confirms that the initial slope of 1% selected for design based on the preliminary hydraulic models and equilibrium slope analysis was appropriate to use.

Table 10: Equilibrium Slopes Calculated for Plan 03

Proposed Geometry Condition, Post-Project Flows, Normal Depth Downstream Boundary Condition			
	Incipient Motion (Eqn. 6-17)	Meyer-Peter Muller (Eqn. 6-18)	AMAFCA
Reach 1	0.046	0.010	0.011
Reach 2	0.075	0.016	0.013
Reach 3	0.034	0.007	0.012
Average	0.052	0.011	0.012

Table 11: Equilibrium Slopes Calculated for Plan 04

Proposed Geometry Condition, Post-Project Flows, Max. WSE Downstream Boundary Condition			
	Incipient Motion (Eqn. 6-17)	Meyer-Peter Muller (Eqn. 6-18)	AMAFCA
Reach 1	0.047	0.010	0.011
Reach 2	0.075	0.016	0.013
Reach 3	0.034	0.007	0.012
Average	0.052	0.011	0.012

Erosion Protection

As mentioned in the previous section, the Unnamed Canyon II channel is not expected to degrade in the proposed condition. Additionally, velocities in the channel between drops are relatively low, with a maximum velocity of 3.9 ft/s and an average velocity of 1.9 ft/s, indicating that erosion is unlikely between drop structures. However, some protection is proposed to be installed along the banks between drops, in order to prevent potential undermining if a low-flow channel were to form and migrate to the banks.

The proposed bank protection will be in the form of turf reinforcement mats (TRM), installed along the channel banks for the channel reaches between grade control structures.

A reasonable assumption for the depth of protection below the invert can be taken from the LA County Sedimentation Manual. Chapter 5 recommends incorporating a toe-down depth of 2 ft. at levees, in order to account for local scour. The proposed TRM will, instead, be installed at a minimum of 2.5 feet below the proposed channel invert. The 2.5 ft. depth adds an extra factor of safety and allows for a smooth transition at the rock at the toe of each drop, which has a minimum thickness of 2.5 ft. The TRM will also extend 1-foot above the invert of the channel (which is greater than the maximum depth found in the channel). **Figure 2** shows a typical section at a grade control structure, which helps demonstrate the TRM placement.

The approach used for sizing the loose and grouted rock at the grade control structures was slightly different than the approach used in the rest of the channel. The velocities observed at each grade control structure vary considerably as the flow transitions between subcritical and supercritical flow regimes. At each grade control structure, additional sections were interpolated within the hydraulic model at 1-foot intervals, in order to capture the rapidly changing depths and velocities. A velocity profile was plotted at each of these sections, as shown in **Figure 3** through **Figure 10**. The zone where rapidly changing velocity occurs was averaged and compared to the peak velocity occurring in that zone. In all cases, it was determined that using the maximum velocity, as opposed to the average, would be suitable for sizing the rock. Rock sizing tables found in Appendix F of the Los Angeles County Hydraulic Design Manual provide guidance on bank protection with respect to channel velocities (See **Table 12**). **Table 13** summarizes the average and maximum velocities at each structure, which can be compared to the minimum LACFCD rock sizes and layer thicknesses shown in **Table 12**. It should be noted that the results from the proposed condition model with downstream boundary condition equal to a maximum water surface elevation were not used in the

TRM / rock sizing analysis, as they represent a condition with maximum flow depths and, therefore, minimum velocities.

The grade control structure chute is proposed to consist of grouted rock, which would also extend 5 feet upstream of the crest. A loose rock apron will be installed downstream of each grade control structure for a length of 8 feet. The rock apron downstream of the grade control structures was set at 8 feet uniformly, since this encompasses the zone where the velocities transition back to sub-critical flow regime at all structures. The channel slopes at each drop structure are also proposed to be lined with grouted rock, from 5 feet upstream of the crest to the end of the apron. **Figure 2** shows a typical section at a grade control structure, which helps demonstrate the loose and grouted rock placement.

Table 12: LACFCD Hydraulic Design Manual – Min. Rock Size for Levees

Channel Velocities (ft/s)	LACFCD Rock Size (D_{50})	LACFCD Levee Thickness (2 x D_{50})	LACFCD Filter Thickness
0 – 7	50 lb. (10-in.)	20-inch	6-inch
7 – 9	100 lb. (12-in.)	24-inch	6-inch
10	150 lb. (15-in.)	30-inch	9-inch

Table 13: Summary of Velocities at Grade Control Structures

Grade Control Structure ID	Station at Crest of Grade Control Structure	Maximum Velocity (ft/s)	Average Velocity (ft/s)
1	36+54.26	6.6	5.1
2	35+37.09	6.8	3.5
3	32+53.32	9.1	5.7
4	30+04.33	7.6	5.6
5	27+04.94	7.3	4.4
6	18+11.06	6.7	5.2
7	16+52.33	7.8	5.6
8	15+22.84	7.5	4.6

Table 13 shows the maximum and average velocities at each grade control structure, which can be compared to the minimum rock sizing criteria from the LA County Hydraulic Design Manual in **Table 12**. In all cases, the rock size selected for design was larger than what the Design Manual requires. The chute and side slopes at each structure is proposed to consist of 100-lb grouted rock. The loose rock apron downstream of each structure is proposed to consist of 150-lb rock. This was done in light of the fact that the rock apron will need to protect against impinging flows, and will therefore need to be more robust.

MATCHLINE SEE BELOW RIGHT

STA 27+04.79
STRUCTURE #5
INV 1199.00
INV 1202.90

STA 30+09.49
STRUCTURE #4
INV 1205.85
INV 1210.86

STA 32+53.43
STRUCTURE #3
INV 1213.35
INV 1217.41

GRADE CONTROL STRUCTURES

CDFW LIMITS

USACE LIMITS

34" GAS LINE

30' EASEMENT FOR GAS LINE

STA 34+40.63
END REACH 2
BEGIN REACH 3

STA 35+36.59
STRUCTURE #2
INV 1220.20
INV 1225.20

STA 36+52.44
STRUCTURE #1
INV 1226.39
INV 1230.13

EX. OVERHEAD
ELECTRICAL LINES (SCE)

SCE EASEMENT

STA 38+95.84
END REACH 3

LOW FLOW
DIVERSION OUTLET
TO CHANNEL

STORM DRAIN
MAIN LINE

MAGIC MOUNTAIN PKWY

STA 18+10.40
STRUCTURE #6
INV 1181.04
INV 1182.84

STA 16+51.64
STRUCTURE #7
INV 1179.47
INV 1177.56

STA 15+22.85
STRUCTURE #8
INV 1176.29
INV 1174.79

GRADE CONTROL STRUCTURE

STA 14+47.98
BEGIN REACH 1

"A" STREET

STA 23+20.35
END REACH 1/
BEGIN REACH 2

4 FT DIA. CULVERT

USACE LIMITS

MATCHLINE SEE ABOVE LEFT

50 25 0 50 100

NO	BY	DATE	REVISIONS	DATE	APP.

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SCALE 1" = 50'
DESIGNED JC
DRAWN BP
CHECKED JC
DATE NOVEMBER 2023
JOB NO. A373

TITLE
UNNAMED CANYON 2
DRAINAGE CHANNEL

JOB
ENTRADA SOUTH
TTM 53295
VALENCIA CA

PACE
Advanced Water Engineering
17520 Newhope Street, Suite 200 | Fountain Valley, CA 92708
P: (714) 481-7300 | www.paceware.com

FIGURE
01

JOB NO. A373

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Dimscale = 1; LTscale = 1; PSltscale = 1; ACAD Ver. = 23.0s (LMS Tech); Viewlan = 1

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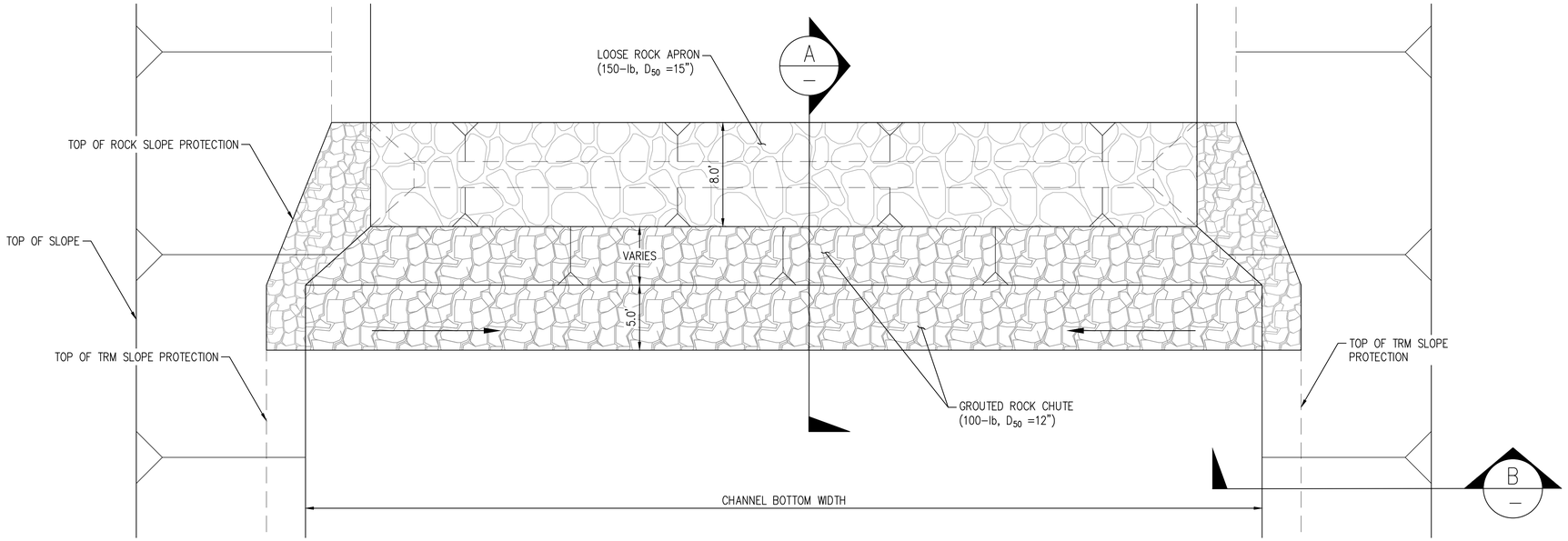

PLAN
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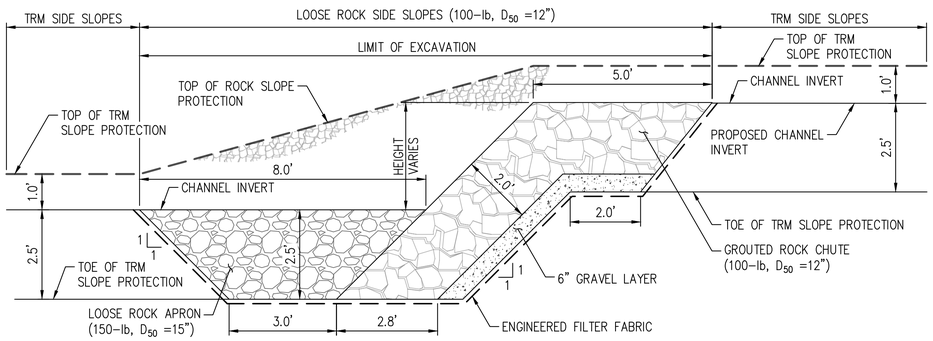

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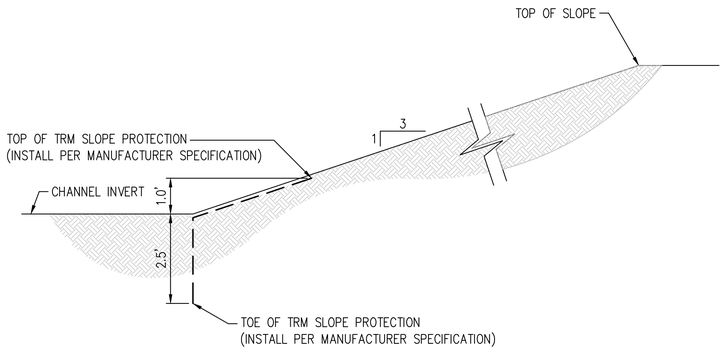

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NO	BY	DATE	REVISIONS	DATE	APP.

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SCALE	1" = 50'
DESIGNED	JC
DRAWN	BP
CHECKED	JC
DATE	JUNE 2022
JOB NO.	A373

TITLE
GRADE CONTROL STRUCTURE PLAN AND SECTIONS

JOB
ENTRADA SOUTH TTM 53295
VALENCIA CA

PACE
Advanced Water Engineering
17520 Newhope Street Suite 200 | Fountain Valley, CA 92708
P: (714) 481-7300 | www.pacewater.com

FIGURE
02

JOB NO. A373

P:\A373\Engineering\GlobalExhibits\A373-Plans and Sections.dwg - Tab: 11X17 PLAN SECTION - by cthompson on 11/22/23 at 4:19:20 PM

Figure 3: Structure 1 Velocity Profile

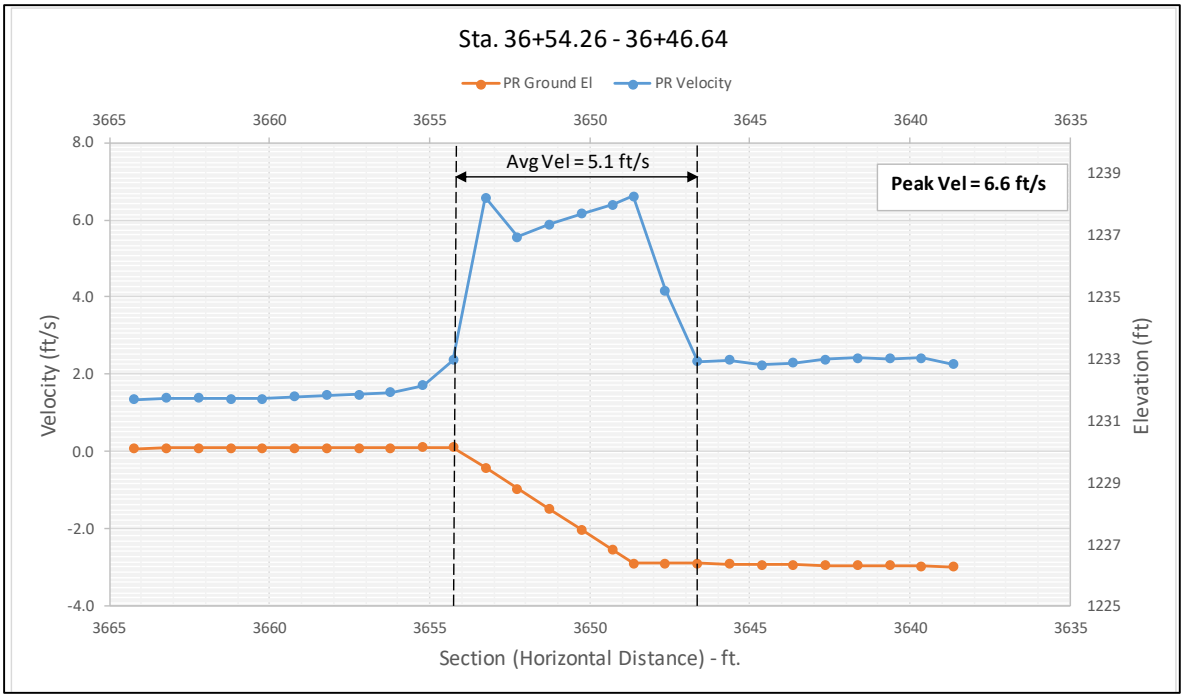


Figure 4: Structure 2 Velocity Profile

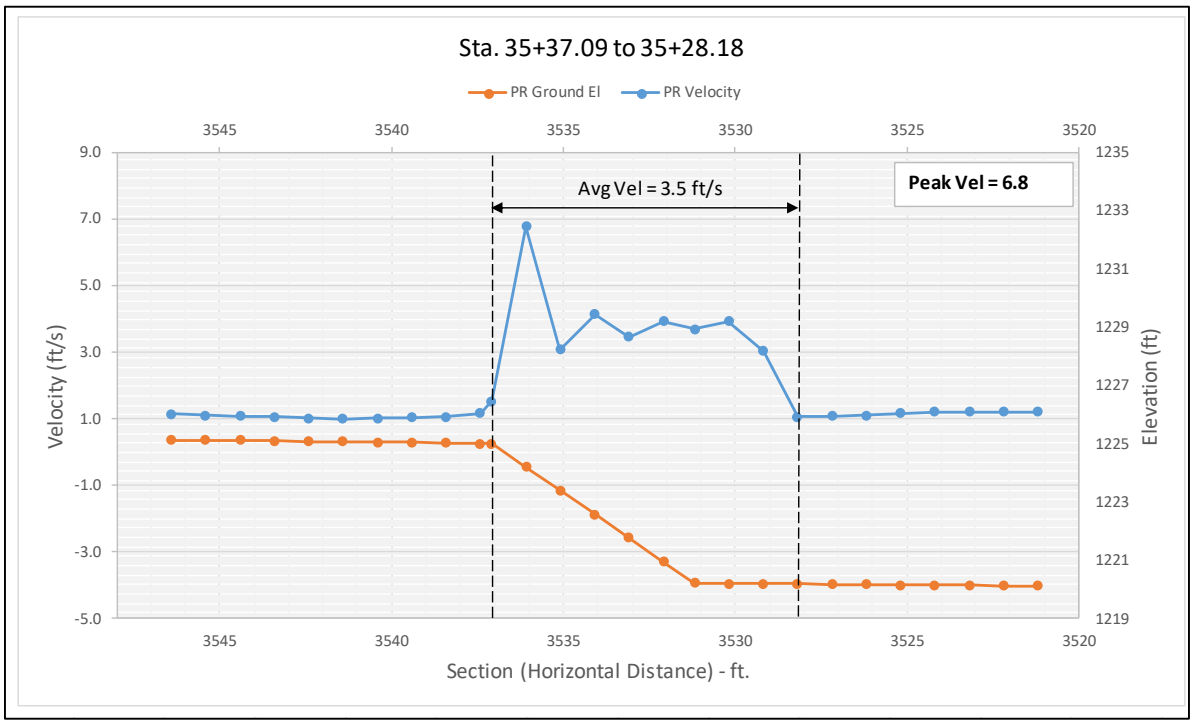


Figure 5: Structure 3 Velocity Profile

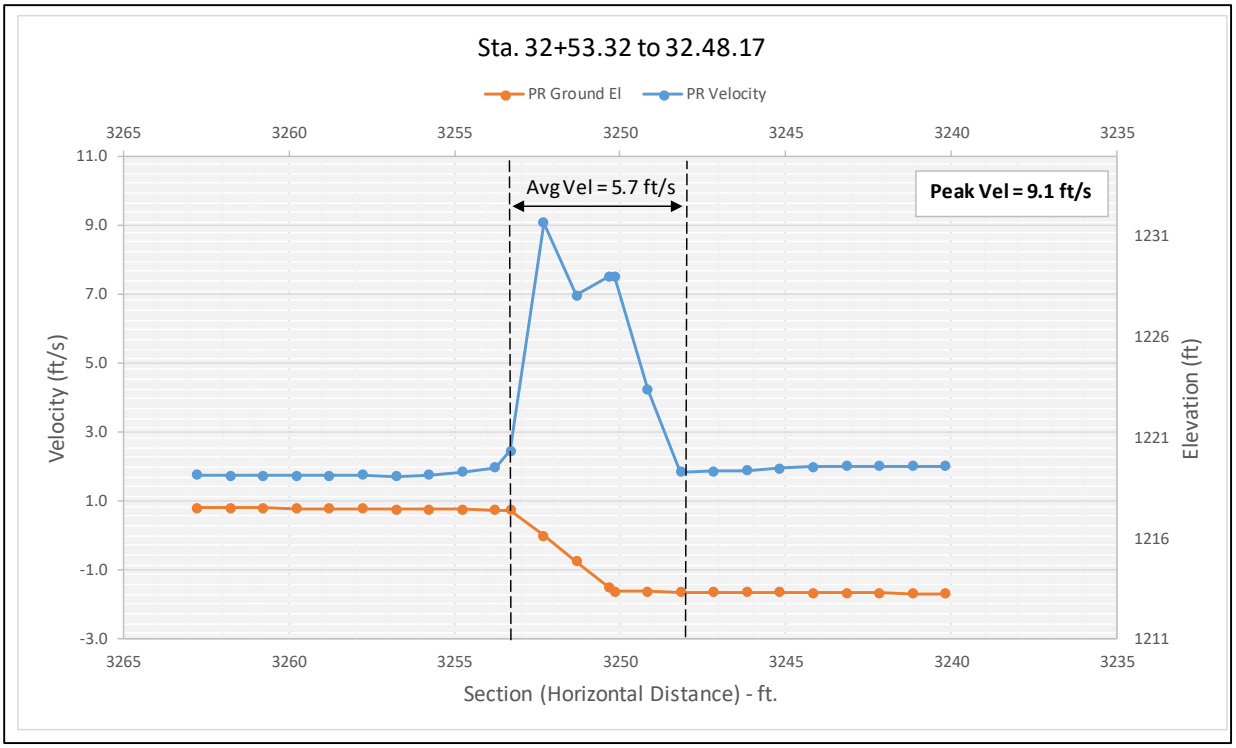


Figure 6: Structure 4 Velocity Profile

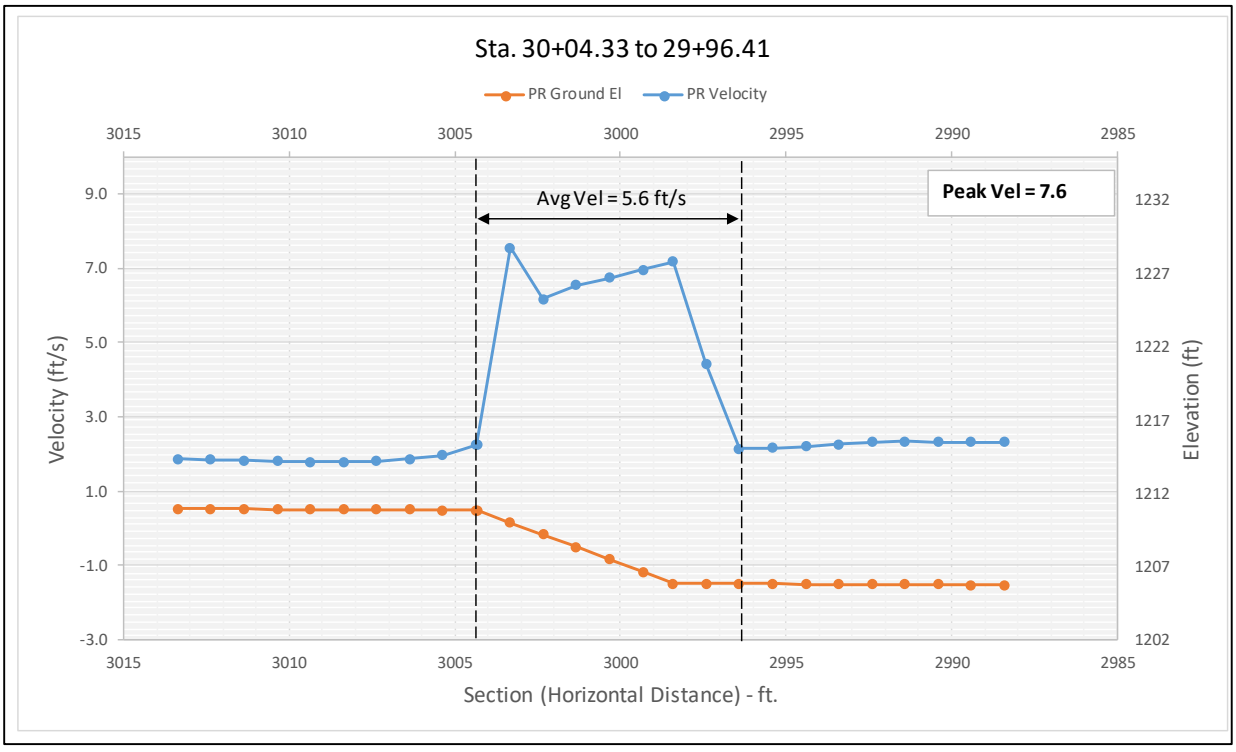


Figure 7: Structure 5 Velocity Profile

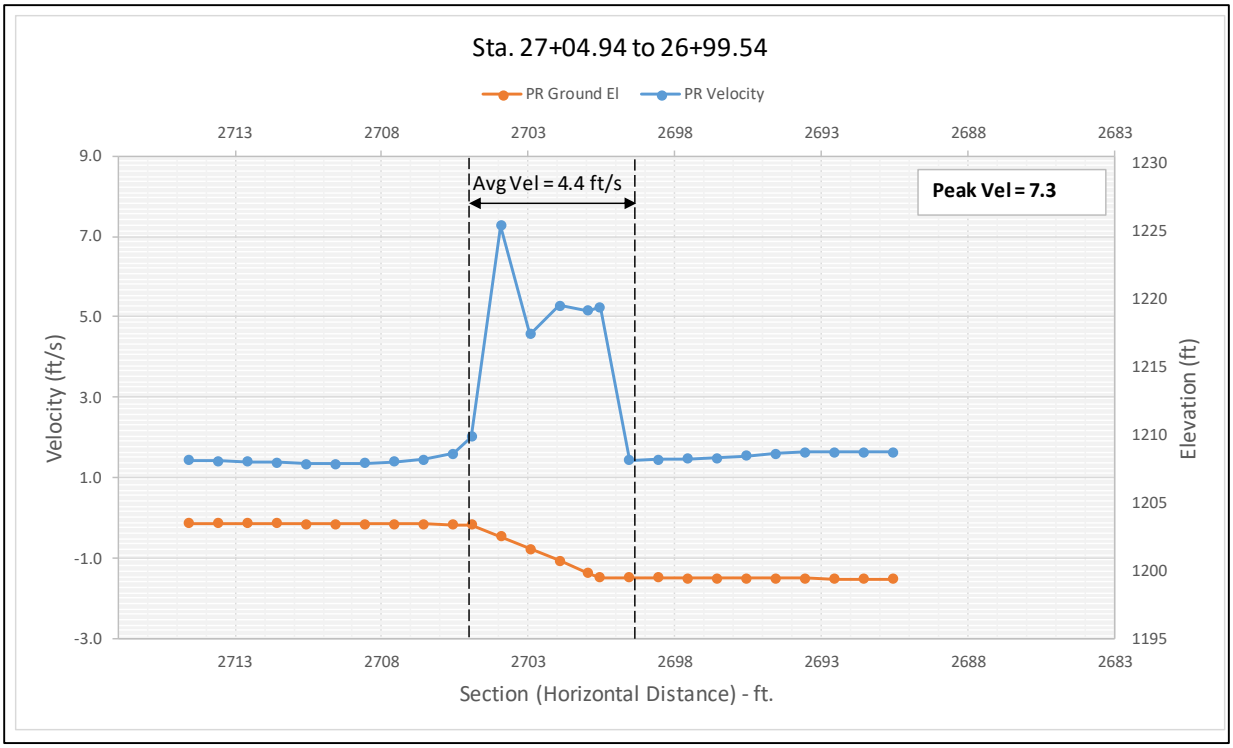


Figure 8: Structure 6 Velocity Profile

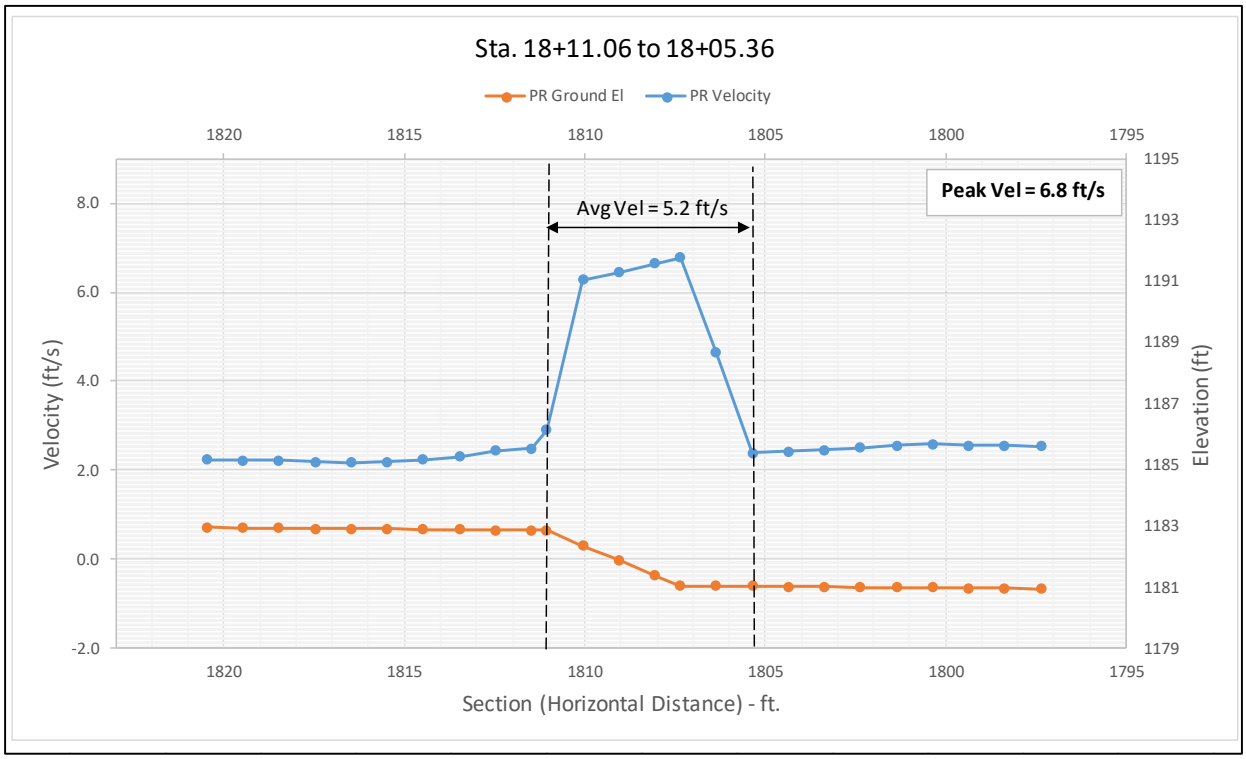


Figure 9: Structure 7 Velocity Profile

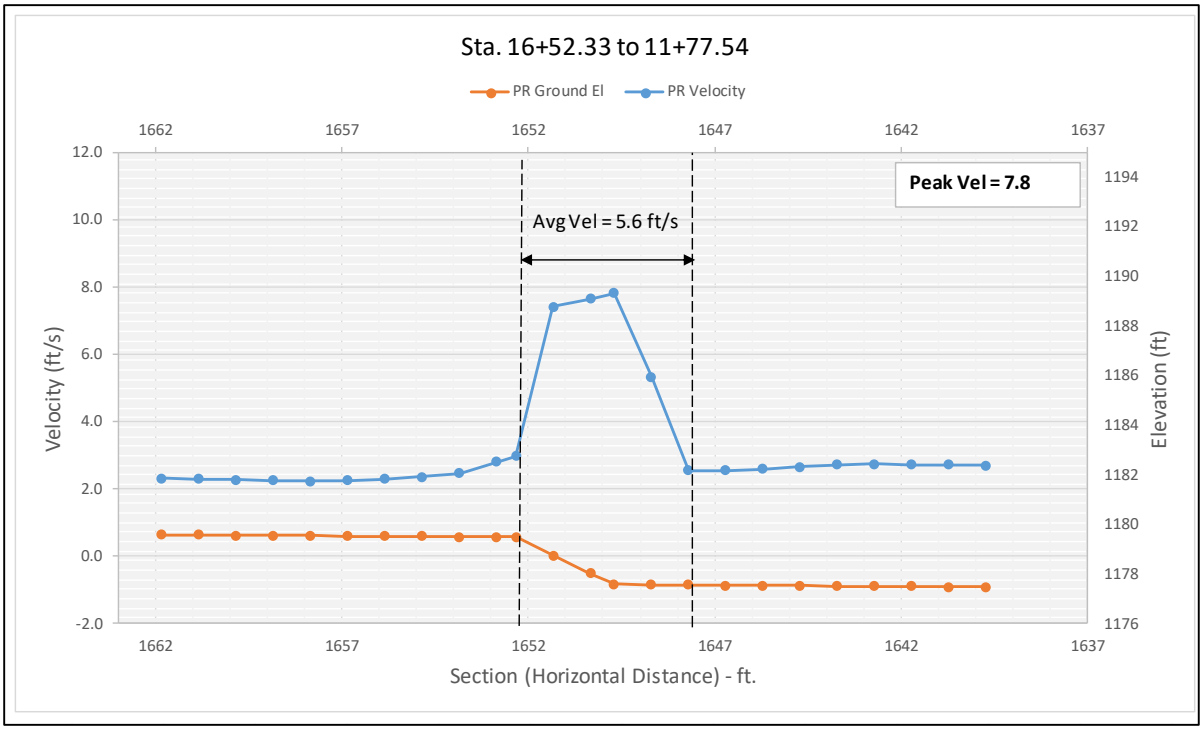
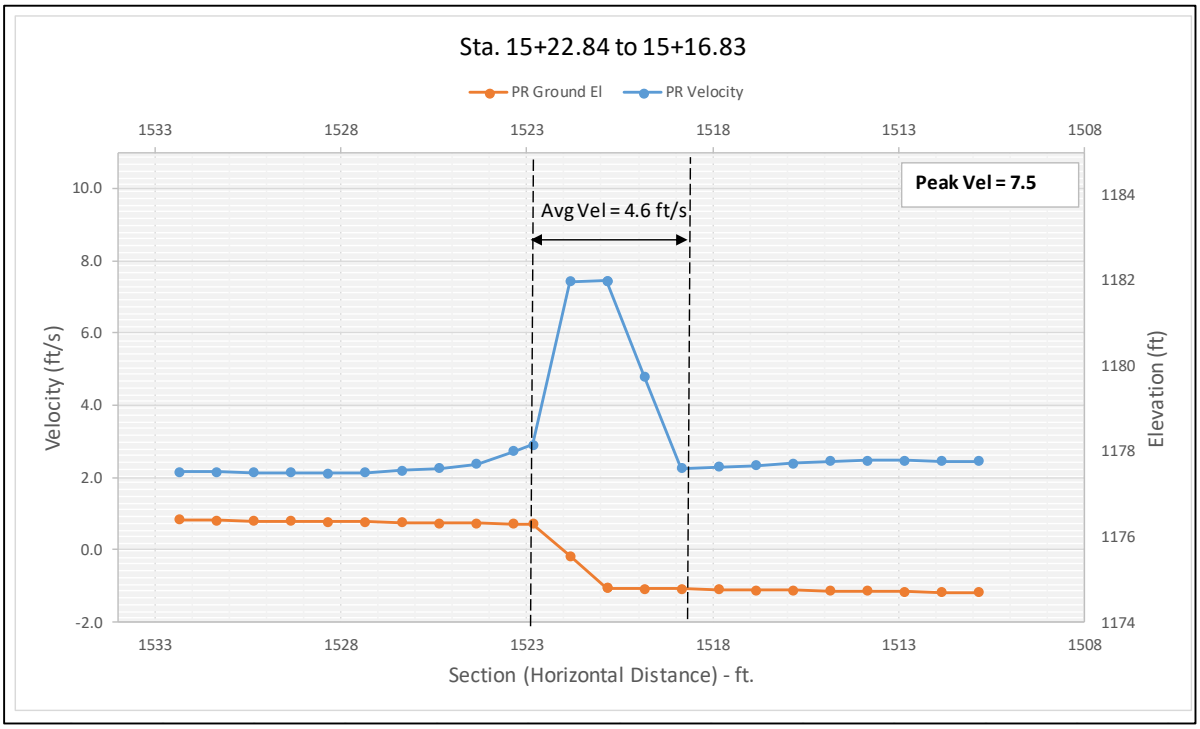


Figure 10: Structure 8 Velocity Profile



1 – HEC-RAS Output Data

Plan 01 - Existing Invert Slope

HEC-RAS Plan: Plan 01 River: Entrada Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3895.84	PF 1	21.70	1230.93	1233.0	1231.55800	1233.03	0.000139	0.73	29.59	20.41	0.11
1	3850.61	PF 1	21.70	1232.17	1232.9		1233.00	0.011530	2.70	8.05	22.07	0.79
1	3806.24	PF 1	21.70	1231.73	1232.5		1232.54	0.008672	2.40	9.03	23.68	0.69
1	3765.08	PF 1	21.70	1231.32	1231.9	1231.87200	1232.02	0.019893	3.08	7.04	23.72	1.00
1	3713.23	PF 1	21.70	1229.97	1230.7	1230.74200	1230.95	0.020959	3.89	5.58	13.88	1.08
1	3654.26	PF 1	21.70	1226.59	1226.7	1226.90400	1227.60	0.375783	7.57	2.91	23.94	3.78
1	3648.64	PF 1	21.70	1226.50	1226.9	1226.82300	1226.98	0.010768	2.43	8.88	26.98	0.75
1	3605.41	PF 1	21.70	1225.91	1226.2	1226.18600	1226.28	0.015634	2.20	9.86	46.51	0.84
1	3537.09	PF 1	21.70	1224.36	1224.9	1224.90000	1225.03	0.021740	2.93	7.41	28.73	1.02
1	3531.18	PF 1	21.70	1224.13	1224.6	1224.67900	1224.85	0.045971	4.00	5.43	23.11	1.45
1	3440.63	PF 1	33.80	1221.99	1222.4	1222.39800	1222.51	0.021709	2.69	12.58	55.96	1.00
1	3366.51	PF 1	33.80	1219.32	1219.8	1219.91800	1220.14	0.050709	4.50	7.51	29.04	1.56
1	3305.78	PF 1	33.80	1216.49	1217.1	1217.16100	1217.39	0.040625	4.54	7.44	24.21	1.44
1	3253.32	PF 1	33.80	1214.98	1215.3	1215.33900	1215.45	0.031966	2.95	11.47	59.68	1.19
1	3250.17	PF 1	33.80	1214.88	1215.2	1215.21300	1215.33	0.042856	3.15	10.72	62.79	1.35
1	3186.18	PF 1	33.80	1213.19	1213.5	1213.53600	1213.65	0.021369	2.66	12.70	56.92	0.99
1	3091.83	PF 1	33.80	1210.75	1211.0	1211.07000	1211.23	0.030997	3.58	9.43	35.53	1.23
1	3030.37	PF 1	33.80	1209.00	1209.4	1209.45100	1209.56	0.023533	2.66	12.72	61.16	1.03
1	3004.33	PF 1	33.80	1208.51	1208.9	1208.89200	1209.00	0.019621	2.69	12.55	51.51	0.96
1	2998.41	PF 1	33.80	1208.37	1208.7	1208.74100	1208.86	0.030946	3.05	11.07	53.02	1.18
1	2955.4	PF 1	33.80	1207.24	1207.7	1207.68300	1207.79	0.023900	2.61	12.96	64.82	1.03
1	2914.65	PF 1	33.80	1206.45	1206.7	1206.77700	1206.88	0.044802	2.99	11.29	73.74	1.35
1	2815.59	PF 1	33.80	1204.13	1204.5	1204.47800	1204.56	0.024134	2.24	15.10	96.03	1.00
1	2782.59	PF 1	33.80	1203.00	1203.3	1203.38600	1203.59	0.034316	4.09	8.25	27.61	1.32
1	2743.58	PF 1	33.80	1202.49	1202.8	1202.82100	1202.89	0.022335	2.02	16.73	117.19	0.94
1	2704.94	PF 1	33.80	1201.05	1201.8	1201.81100	1201.91	0.028004	2.57	13.16	75.83	1.09
1	2700.54	PF 1	33.80	1201.55	1201.7	1201.69500	1201.81	0.016812	0.84	11.46	59.30	0.68
1	2661.04	PF 1	33.80	1200.70	1200.9	1200.95700	1201.17	0.151758	4.41	7.68	71.15	2.35
1	2616.7	PF 1	33.80	1199.67	1200.0	1200.02600	1200.08	0.018473	1.71	20.26	172.82	0.84
1	2540.68	PF 1	33.80	1198.01	1198.4	1198.38700	1198.45	0.025275	1.97	17.17	136.97	0.98
1	2481.7	PF 1	33.80	1196.68	1197.1	1197.08500	1197.17	0.016217	1.76	15.58	89.63	0.81
1	2409.33	PF 1	33.80	1195.25	1195.4	1195.48300	1195.61	0.040402	1.60	14.05	164.52	1.11
1	2320.35	PF 1	37.50	1193.00	1193.1	1193.14100	1193.21	0.025910	2.09	17.91	133.09	1.01
1	2119.93	PF 1	37.50	1187.00	1187.4	1187.46900	1187.68	0.029161	4.23	8.87	25.05	1.25
1	2068.55	PF 1	37.50	1186.00	1186.3	1186.37700	1186.61	0.048602	4.59	8.17	29.88	1.55
1	2000.07	PF 1	37.50	1184.00	1185.3	1185.09600	1185.50	0.008248	3.88	9.66	11.55	0.75
1	1943.65	PF 1	37.50	1183.66	1184.6	1184.64000	1184.91	0.012921	4.28	9.43	18.96	0.91
1	1862.48	PF 1	37.50	1181.99	1182.5	1182.63600	1183.03	0.049864	6.04	6.21	15.25	1.67

HEC-RAS Plan: Plan 01 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1811.06	PF 1	37.50	1180.69	1181.5	1181.45600	1181.78	0.015965	4.55	8.24	12.98	1.01
1	1807.36	PF 1	37.50	1180.46	1181.1	1181.23100	1181.66	0.044835	6.20	6.05	13.06	1.61
1	1777.34	PF 1	37.50	1180.00	1180.5	1180.56200	1180.78	0.032395	4.33	8.65	25.25	1.30
1	1709.86	PF 1	37.50	1178.12	1178.7	1178.75700	1178.94	0.046848	5.95	9.57	45.92	1.57
1	1652.33	PF 1	37.50	1177.00	1177.5	1177.44300	1177.62	0.012515	3.06	12.66	33.45	0.84
1	1649.71	PF 1	37.50	1177.00	1177.5		1177.58	0.010123	2.70	13.95	35.38	0.75
1	1602.35	PF 1	37.50	1176.22	1176.7	1176.70800	1176.89	0.018826	3.32	11.11	30.98	1.00
1	1522.84	PF 1	37.50	1174.86	1175.2	1175.21700	1175.36	0.018767	3.09	12.67	46.01	0.98
1	1520.83	PF 1	37.50	1174.81	1175.1	1175.16500	1175.31	0.027073	3.47	11.18	45.02	1.16
1	1447.98	PF 1	37.50	1172.71	1173.2	1173.19600	1173.31	0.027521	2.84	13.36	68.00	1.11

Plan 02 - Existing Invert Slope - Self-Form Channel

HEC-RAS Plan: Plan 02 River: Entrada Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3895.84	PF 1	21.70	1230.68	1232.3	1230.92200	1232.31	0.000042	0.42	52.27	32.20	0.06
1	3850.61	PF 1	21.70	1231.92	1232.2		1232.29	0.013040	2.40	9.06	32.33	0.80
1	3806.24	PF 1	21.70	1231.48	1231.8		1231.88	0.006614	1.95	11.11	32.20	0.59
1	3765.08	PF 1	21.70	1231.07	1231.3	1231.31100	1231.43	0.021615	2.79	7.77	32.20	1.00
1	3713.23	PF 1	21.70	1229.72	1229.9	1229.96200	1230.09	0.031546	3.13	6.93	32.20	1.19
1	3654.26	PF 1	21.70	1226.37	1226.5	1226.61200	1226.85	0.116271	4.64	4.68	32.20	2.15
1	3648.64	PF 1	21.70	1226.25	1226.4	1226.49100	1226.65	0.060885	3.82	5.68	32.20	1.60
1	3605.41	PF 1	21.70	1225.66	1225.9	1225.90200	1226.02	0.021292	2.78	7.80	32.20	1.00
1	3537.09	PF 1	21.70	1224.09	1224.3	1224.33100	1224.45	0.025049	2.92	7.43	32.20	1.07
1	3531.18	PF 1	21.70	1223.86	1224.1	1224.10000	1224.25	0.046931	3.53	6.15	32.20	1.42
1	3440.63	PF 1	33.80	1221.72	1222.0	1222.00900	1222.15	0.020145	3.04	11.10	38.40	1.00
1	3366.51	PF 1	33.80	1219.05	1219.2	1219.33400	1219.56	0.073742	4.50	7.51	38.40	1.79
1	3305.78	PF 1	33.80	1216.22	1216.5	1216.50900	1216.66	0.032484	3.52	9.61	38.40	1.24
1	3253.32	PF 1	33.80	1214.73	1215.0	1215.02000	1215.17	0.025031	3.25	10.40	38.41	1.10
1	3250.17	PF 1	33.80	1214.61	1214.8	1214.89700	1215.06	0.038407	3.70	9.14	38.40	1.34
1	3186.18	PF 1	33.80	1212.92	1213.1	1213.20800	1213.41	0.060432	4.24	7.97	38.40	1.64
1	3091.83	PF 1	33.80	1210.48	1210.8	1210.76900	1210.91	0.020145	3.04	11.10	38.40	1.00
1	3030.37	PF 1	33.80	1208.73	1209.0	1209.01800	1209.19	0.041500	3.79	8.93	38.40	1.38
1	3004.33	PF 1	33.80	1208.24	1208.5	1208.52900	1208.67	0.020230	3.05	11.09	38.40	1.00
1	2998.41	PF 1	33.80	1208.10	1208.4	1208.38700	1208.54	0.026415	3.30	10.23	38.40	1.13
1	2955.4	PF 1	33.80	1206.97	1207.2	1207.25900	1207.41	0.026137	3.29	10.27	38.40	1.12
1	2914.65	PF 1	33.80	1206.18	1206.5	1206.48700	1206.61	0.021438	2.81	12.04	49.36	1.00
1	2815.59	PF 1	33.80	1203.86	1204.1	1204.14300	1204.30	0.025667	3.27	10.32	38.40	1.11
1	2782.59	PF 1	33.80	1202.73	1203.1	1203.01800	1203.19	0.009136	2.40	14.10	38.40	0.70
1	2743.58	PF 1	33.80	1202.22	1202.5	1202.50300	1202.65	0.021528	3.11	10.88	38.41	1.03
1	2704.94	PF 1	33.80	1200.78	1201.2	1201.06900	1201.26	0.006465	2.16	15.68	38.65	0.60
1	2700.54	PF 1	33.80	1200.73	1201.2		1201.23	0.005107	2.00	16.94	39.27	0.54
1	2661.04	PF 1	33.80	1200.43	1200.7	1200.71600	1200.86	0.021288	3.07	10.99	39.05	1.02
1	2616.7	PF 1	33.80	1199.40	1199.7	1199.68900	1199.84	0.025171	3.26	10.38	38.40	1.10
1	2540.68	PF 1	33.80	1197.74	1198.0	1198.02800	1198.20	0.046482	3.92	8.63	38.40	1.46
1	2481.7	PF 1	33.80	1196.29	1196.6	1196.57900	1196.72	0.020117	3.04	11.11	38.41	1.00
1	2409.33	PF 1	33.80	1194.83	1195.1	1195.11900	1195.26	0.019296	3.00	11.25	38.41	0.98
1	2320.35	PF 1	37.50	1192.71	1193.0	1193.04200	1193.12	0.029572	2.23	16.85	125.51	1.07
1	2119.93	PF 1	37.50	1186.71	1187.0	1187.01100	1187.17	0.029613	3.50	10.71	40.10	1.20
1	2068.55	PF 1	37.50	1185.71	1186.0	1186.01100	1186.16	0.019917	3.11	12.07	40.10	1.00
1	2000.07	PF 1	37.50	1183.71	1184.2	1184.01100	1184.26	0.004015	1.92	19.58	40.10	0.48
1	1943.65	PF 1	37.50	1183.37	1183.7	1183.67100	1183.82	0.019837	3.10	12.08	40.10	1.00
1	1862.48	PF 1	37.50	1181.70	1182.0	1182.00000	1182.15	0.021346	3.17	11.82	40.10	1.03

HEC-RAS Plan: Plan 02 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1811.06	PF 1	37.50	1180.40	1180.7	1180.70100	1180.86	0.030067	3.52	10.66	40.10	1.20
1	1807.36	PF 1	37.50	1180.17	1180.4	1180.47100	1180.69	0.063838	4.42	8.49	40.10	1.69
1	1777.34	PF 1	37.50	1179.71	1180.0	1180.01000	1180.16	0.019998	3.11	12.05	40.10	1.00
1	1709.86	PF 1	37.50	1177.83	1178.1	1178.13100	1178.30	0.039832	3.83	9.79	40.10	1.37
1	1652.33	PF 1	37.50	1176.71	1177.1	1177.00700	1177.20	0.007537	2.32	16.18	40.10	0.64
1	1649.71	PF 1	37.50	1176.71	1177.0	1177.00900	1177.16	0.017663	3.00	12.51	40.10	0.95
1	1602.35	PF 1	37.50	1175.93	1176.3	1176.22900	1176.39	0.014803	2.84	13.20	40.10	0.87
1	1522.84	PF 1	37.50	1174.57	1174.9	1174.87000	1175.02	0.020025	3.11	12.05	40.10	1.00
1	1520.83	PF 1	37.50	1174.52	1174.8	1174.82000	1174.98	0.028433	3.46	10.84	40.10	1.17
1	1447.98	PF 1	37.50	1172.42	1172.7	1172.71900	1172.88	0.029257	3.49	10.74	40.10	1.19

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3895.84	PF 1	21.70	1230.93	1233.0	1231.55800	1233.03	0.000139	0.73	29.59	20.41	0.11
1	3850.61	PF 1	21.70	1232.17	1232.9		1233.00	0.011530	2.70	8.05	22.07	0.79
1	3806.24	PF 1	21.70	1231.73	1232.5		1232.54	0.008672	2.40	9.03	23.68	0.69
1	3765.08	PF 1	21.70	1231.32	1231.9	1231.87200	1232.02	0.019893	3.08	7.04	23.72	1.00
1	3713.23	PF 1	21.70	1229.97	1230.7	1230.74200	1230.95	0.020959	3.89	5.58	13.88	1.08
1	3712.23*	PF 1	21.70	1229.97	1230.6	1230.69800	1230.93	0.028716	4.41	4.92	12.79	1.25
1	3711.23*	PF 1	21.70	1229.98	1230.7	1230.66200	1230.87	0.018929	3.74	5.80	14.14	1.03
1	3710.23*	PF 1	21.70	1229.98	1230.6	1230.62600	1230.85	0.027251	4.30	5.05	13.16	1.22
1	3709.23*	PF 1	21.70	1229.98	1230.6	1230.59100	1230.80	0.020686	3.84	5.66	14.21	1.07
1	3708.23*	PF 1	21.70	1229.98	1230.5	1230.56200	1230.78	0.026817	4.19	5.18	13.90	1.21
1	3707.23*	PF 1	21.70	1229.99	1230.6	1230.53600	1230.74	0.013990	3.25	6.67	16.02	0.89
1	3706.23*	PF 1	21.70	1229.99	1230.6		1230.72	0.012447	3.08	7.04	16.82	0.84
1	3705.23*	PF 1	21.70	1229.99	1230.6		1230.70	0.010774	2.89	7.50	17.65	0.78
1	3704.23*	PF 1	21.70	1229.99	1230.6		1230.68	0.009571	2.74	7.91	18.46	0.74
1	3703.23*	PF 1	21.70	1230.00	1230.6		1230.67	0.008950	2.65	8.19	19.18	0.71
1	3702.23*	PF 1	21.70	1230.00	1230.6		1230.66	0.008035	2.53	8.58	19.88	0.68
1	3701.23*	PF 1	21.70	1230.00	1230.6		1230.65	0.007371	2.43	8.95	20.68	0.65
1	3700.23*	PF 1	21.70	1230.01	1230.6		1230.64	0.007052	2.36	9.20	21.46	0.64
1	3699.23*	PF 1	21.70	1230.01	1230.5		1230.63	0.006505	2.27	9.56	22.23	0.61
1	3698.23*	PF 1	21.70	1230.01	1230.5		1230.62	0.005940	2.18	9.97	23.06	0.58
1	3697.23*	PF 1	21.70	1230.01	1230.5		1230.61	0.005542	2.10	10.32	23.86	0.56
1	3696.23*	PF 1	21.70	1230.02	1230.5		1230.60	0.005447	2.06	10.51	24.67	0.56
1	3695.23*	PF 1	21.70	1230.02	1230.5		1230.60	0.005109	2.00	10.85	25.49	0.54
1	3694.23*	PF 1	21.70	1230.02	1230.5		1230.59	0.004754	1.93	11.23	26.32	0.52
1	3693.23*	PF 1	21.70	1230.02	1230.5		1230.58	0.004474	1.87	11.59	27.18	0.51
1	3692.23*	PF 1	21.70	1230.03	1230.5		1230.58	0.004499	1.85	11.70	27.97	0.51
1	3691.23*	PF 1	21.70	1230.03	1230.5		1230.57	0.004273	1.81	12.02	28.78	0.49
1	3690.23*	PF 1	21.70	1230.03	1230.5		1230.57	0.004035	1.75	12.37	29.66	0.48
1	3689.23*	PF 1	21.70	1230.04	1230.5		1230.56	0.004099	1.74	12.44	30.44	0.48
1	3688.23*	PF 1	21.70	1230.04	1230.5		1230.56	0.003921	1.70	12.74	31.24	0.47
1	3687.23*	PF 1	21.70	1230.04	1230.5		1230.56	0.003744	1.66	13.07	32.14	0.46
1	3686.23*	PF 1	21.70	1230.04	1230.5		1230.55	0.003575	1.62	13.38	32.94	0.45
1	3685.23*	PF 1	21.70	1230.05	1230.5		1230.55	0.003658	1.62	13.41	33.70	0.45
1	3684.23*	PF 1	21.70	1230.05	1230.5		1230.54	0.003504	1.58	13.71	34.49	0.44
1	3683.23*	PF 1	21.70	1230.05	1230.5		1230.54	0.003399	1.55	13.98	35.41	0.44
1	3682.23*	PF 1	21.70	1230.05	1230.5		1230.54	0.003259	1.52	14.27	36.08	0.43
1	3681.23*	PF 1	21.70	1230.06	1230.5		1230.53	0.003366	1.52	14.23	36.76	0.43
1	3680.22*	PF 1	21.70	1230.06	1230.5		1230.53	0.003240	1.50	14.51	37.49	0.42

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3679.22*	PF 1	21.70	1230.06	1230.5		1230.52	0.003115	1.47	14.79	38.20	0.42
1	3678.22*	PF 1	21.70	1230.06	1230.5		1230.52	0.003017	1.44	15.05	38.90	0.41
1	3677.22*	PF 1	21.70	1230.07	1230.5		1230.52	0.003165	1.45	14.93	39.54	0.42
1	3676.22*	PF 1	21.70	1230.07	1230.5		1230.51	0.003060	1.43	15.19	40.28	0.41
1	3675.22*	PF 1	21.70	1230.07	1230.5		1230.51	0.002980	1.41	15.42	40.99	0.40
1	3674.22*	PF 1	21.70	1230.08	1230.5		1230.51	0.003166	1.42	15.24	41.64	0.42
1	3673.22*	PF 1	21.70	1230.08	1230.5		1230.50	0.003087	1.40	15.46	42.34	0.41
1	3672.22*	PF 1	21.70	1230.08	1230.5		1230.50	0.003015	1.38	15.67	43.08	0.40
1	3671.22*	PF 1	21.70	1230.08	1230.5		1230.50	0.002965	1.37	15.87	43.89	0.40
1	3670.22*	PF 1	21.70	1230.09	1230.5		1230.49	0.003196	1.39	15.62	44.59	0.41
1	3669.22*	PF 1	21.70	1230.09	1230.5		1230.49	0.003153	1.37	15.80	45.44	0.41
1	3668.22*	PF 1	21.70	1230.09	1230.5		1230.49	0.003100	1.36	15.99	46.20	0.41
1	3667.22*	PF 1	21.70	1230.09	1230.5		1230.48	0.003070	1.34	16.15	47.05	0.40
1	3666.22*	PF 1	21.70	1230.10	1230.5		1230.48	0.003354	1.37	15.83	47.83	0.42
1	3665.22*	PF 1	21.70	1230.10	1230.4		1230.48	0.003330	1.36	15.97	48.63	0.42
1	3664.22*	PF 1	21.70	1230.10	1230.4		1230.47	0.003283	1.35	16.10	49.11	0.41
1	3663.22*	PF 1	21.70	1230.11	1230.4		1230.47	0.003643	1.38	15.67	49.59	0.43
1	3662.22*	PF 1	21.70	1230.11	1230.4		1230.47	0.003617	1.38	15.76	50.09	0.43
1	3661.22*	PF 1	21.70	1230.11	1230.4		1230.46	0.003610	1.37	15.84	50.59	0.43
1	3660.22*	PF 1	21.70	1230.11	1230.4		1230.46	0.003624	1.37	15.88	51.09	0.43
1	3659.22*	PF 1	21.70	1230.12	1230.4		1230.45	0.007520	1.43	15.22	51.56	0.46
1	3658.22*	PF 1	21.70	1230.12	1230.4		1230.45	0.008067	1.45	14.95	52.04	0.48
1	3657.22*	PF 1	21.70	1230.12	1230.4		1230.44	0.008810	1.48	14.61	52.49	0.50
1	3656.22*	PF 1	21.70	1230.12	1230.4		1230.43	0.009900	1.53	14.16	52.95	0.52
1	3655.22*	PF 1	21.70	1230.13	1230.4		1230.42	0.014797	1.72	12.59	53.35	0.63
1	3654.26	PF 1	21.70	1230.13	1230.3	1230.30400	1230.39	0.042236	2.36	9.20	53.50	1.00
1	3653.26*	PF 1	21.70	1229.47	1229.5	1229.65400	1230.21	1.136483	6.58	3.30	48.58	4.46
1	3652.26*	PF 1	21.70	1228.80	1228.9	1228.99600	1229.37	0.572175	5.56	3.91	44.39	3.30
1	3651.26*	PF 1	21.70	1228.14	1228.2	1228.35000	1228.77	0.606282	5.89	3.69	40.11	3.42
1	3650.27*	PF 1	21.70	1227.47	1227.6	1227.69600	1228.16	0.604119	6.15	3.53	35.84	3.46
1	3649.27*	PF 1	21.70	1226.81	1226.9	1227.05700	1227.56	0.583646	6.40	3.39	31.59	3.45
1	3648.64	PF 1	21.70	1226.39	1226.5	1226.65200	1227.18	0.576943	6.61	3.28	28.93	3.46
1	3647.64*	PF 1	21.70	1226.38	1226.6	1226.63400	1226.82	0.133642	4.17	5.21	30.55	1.78
1	3646.64*	PF 1	21.70	1226.37	1226.7	1226.61700	1226.75	0.021358	2.34	9.26	32.53	0.77
1	3645.64*	PF 1	21.70	1226.36	1226.6		1226.73	0.022903	2.36	9.20	33.72	0.80
1	3644.64*	PF 1	21.70	1226.34	1226.6		1226.70	0.020637	2.25	9.63	34.99	0.76
1	3643.64*	PF 1	21.70	1226.33	1226.6		1226.68	0.023151	2.30	9.43	36.17	0.80
1	3642.64*	PF 1	21.70	1226.32	1226.6		1226.66	0.027300	2.39	9.08	37.33	0.85

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3641.64*	PF 1	21.70	1226.31	1226.5	1226.52700	1226.64	0.016737	2.42	8.96	38.52	0.88
1	3640.64*	PF 1	21.70	1226.30	1226.5		1226.62	0.017231	2.41	9.00	39.75	0.89
1	3639.64*	PF 1	21.70	1226.29	1226.5	1226.49900	1226.60	0.018043	2.42	8.98	40.96	0.91
1	3638.64*	PF 1	21.70	1226.27	1226.5		1226.58	0.015049	2.26	9.60	42.28	0.84
1	3637.64*	PF 1	21.70	1226.26	1226.5		1226.56	0.015018	2.23	9.72	43.52	0.83
1	3636.64*	PF 1	21.70	1226.25	1226.5		1226.55	0.015091	2.21	9.82	44.76	0.83
1	3635.64*	PF 1	21.70	1226.24	1226.5		1226.53	0.015345	2.20	9.87	46.00	0.84
1	3634.64*	PF 1	21.70	1226.23	1226.4		1226.52	0.015927	2.20	9.87	47.23	0.85
1	3633.64*	PF 1	21.70	1226.22	1226.4		1226.50	0.016706	2.21	9.83	48.45	0.86
1	3632.64*	PF 1	21.70	1226.20	1226.4		1226.48	0.013909	2.07	10.50	49.77	0.79
1	3631.64*	PF 1	21.70	1226.19	1226.4		1226.47	0.013893	2.05	10.60	51.01	0.79
1	3630.64*	PF 1	21.70	1226.18	1226.4		1226.45	0.013955	2.03	10.69	52.26	0.79
1	3629.64*	PF 1	21.70	1226.17	1226.4		1226.44	0.014075	2.02	10.76	53.51	0.79
1	3628.64*	PF 1	21.70	1226.16	1226.4		1226.42	0.014379	2.01	10.79	54.75	0.80
1	3627.64*	PF 1	21.70	1226.15	1226.3		1226.41	0.015033	2.02	10.75	55.98	0.81
1	3626.64*	PF 1	21.70	1226.14	1226.3		1226.39	0.015951	2.04	10.65	57.21	0.83
1	3625.64*	PF 1	21.70	1226.12	1226.3		1226.37	0.013205	1.91	11.37	58.53	0.76
1	3624.64*	PF 1	21.70	1226.11	1226.3		1226.36	0.013263	1.89	11.45	59.78	0.76
1	3623.64*	PF 1	21.70	1226.10	1226.3		1226.35	0.013434	1.89	11.50	61.02	0.77
1	3622.64*	PF 1	21.70	1226.09	1226.3		1226.33	0.013747	1.88	11.52	62.27	0.77
1	3621.64*	PF 1	21.70	1226.08	1226.3		1226.32	0.014457	1.90	11.43	63.49	0.79
1	3620.64*	PF 1	21.70	1226.07	1226.2		1226.30	0.015350	1.92	11.32	64.73	0.81
1	3619.64*	PF 1	21.70	1226.05	1226.2		1226.29	0.012628	1.79	12.10	66.05	0.74
1	3618.64*	PF 1	21.70	1226.04	1226.2		1226.27	0.012677	1.78	12.17	67.29	0.74
1	3617.64*	PF 1	21.70	1226.03	1226.2		1226.26	0.012796	1.77	12.23	68.55	0.74
1	3616.64*	PF 1	21.70	1226.02	1226.2		1226.25	0.012963	1.77	12.27	69.80	0.74
1	3615.64*	PF 1	21.70	1226.01	1226.2		1226.23	0.013310	1.77	12.26	71.04	0.75
1	3614.64*	PF 1	21.70	1226.00	1226.2		1226.22	0.014054	1.79	12.14	72.29	0.77
1	3613.64*	PF 1	21.70	1225.99	1226.2		1226.21	0.015076	1.81	11.97	73.51	0.79
1	3612.64*	PF 1	21.70	1225.97	1226.1		1226.19	0.012262	1.69	12.83	74.84	0.72
1	3611.63*	PF 1	21.70	1225.96	1226.1		1226.18	0.012310	1.68	12.90	76.09	0.72
1	3610.63*	PF 1	21.70	1225.95	1226.1		1226.16	0.012404	1.68	12.95	77.34	0.72
1	3609.63*	PF 1	21.70	1225.94	1226.1		1226.15	0.012601	1.67	12.98	78.60	0.73
1	3608.63*	PF 1	21.70	1225.93	1226.1		1226.14	0.013111	1.68	12.90	79.84	0.74
1	3607.63*	PF 1	21.70	1225.92	1226.1		1226.12	0.013633	1.69	12.83	81.09	0.75
1	3606.63*	PF 1	21.70	1225.90	1226.1		1226.11	0.010805	1.57	13.85	82.41	0.67
1	3605.63*	PF 1	21.70	1225.89	1226.1		1226.10	0.010504	1.54	14.05	83.67	0.66
1	3605.41	PF 1	21.70	1225.89	1226.1		1226.09	0.011142	1.57	13.82	83.93	0.68

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3604.41*	PF 1	21.70	1225.88	1226.0		1226.08	0.010850	1.55	14.03	85.35	0.67
1	3603.41*	PF 1	21.70	1225.86	1226.0		1226.07	0.011324	1.56	13.94	86.78	0.68
1	3602.41*	PF 1	21.70	1225.85	1226.0		1226.06	0.011070	1.54	14.12	88.20	0.68
1	3601.41*	PF 1	21.70	1225.84	1226.0		1226.05	0.010826	1.52	14.31	89.62	0.67
1	3600.41*	PF 1	21.70	1225.82	1226.0		1226.03	0.011283	1.53	14.22	91.05	0.68
1	3599.41*	PF 1	21.70	1225.81	1226.0		1226.02	0.011080	1.51	14.39	92.47	0.67
1	3598.41*	PF 1	21.70	1225.80	1226.0		1226.01	0.010828	1.49	14.58	93.88	0.67
1	3597.41*	PF 1	21.70	1225.79	1226.0		1226.00	0.010588	1.47	14.77	95.30	0.66
1	3596.41*	PF 1	21.70	1225.77	1226.0		1225.99	0.011052	1.48	14.66	96.73	0.67
1	3595.41*	PF 1	21.70	1225.76	1225.9		1225.98	0.010818	1.46	14.84	98.15	0.66
1	3594.41*	PF 1	21.70	1225.75	1225.9		1225.96	0.010538	1.44	15.05	99.57	0.65
1	3593.41*	PF 1	21.70	1225.73	1225.9		1225.95	0.010971	1.45	14.95	101.01	0.67
1	3592.41*	PF 1	21.70	1225.72	1225.9		1225.94	0.010755	1.43	15.13	102.43	0.66
1	3591.41*	PF 1	21.70	1225.71	1225.9		1225.93	0.010519	1.42	15.31	103.85	0.65
1	3590.41*	PF 1	21.70	1225.69	1225.9		1225.92	0.011018	1.43	15.18	105.27	0.66
1	3589.41*	PF 1	21.70	1225.68	1225.9		1225.91	0.010816	1.41	15.35	106.69	0.66
1	3588.41*	PF 1	21.70	1225.67	1225.9		1225.89	0.010591	1.40	15.53	108.11	0.65
1	3587.41*	PF 1	21.70	1225.66	1225.9		1225.88	0.010288	1.38	15.75	109.53	0.64
1	3586.41*	PF 1	21.70	1225.64	1225.8		1225.87	0.010719	1.39	15.63	110.96	0.65
1	3585.41*	PF 1	21.70	1225.63	1225.8		1225.86	0.010475	1.37	15.82	112.39	0.64
1	3584.41*	PF 1	21.70	1225.62	1225.8		1225.85	0.010243	1.36	16.01	113.81	0.64
1	3583.41*	PF 1	21.70	1225.60	1225.8		1225.84	0.010698	1.37	15.88	115.24	0.65
1	3582.41*	PF 1	21.70	1225.59	1225.8		1225.83	0.010500	1.35	16.05	116.66	0.64
1	3581.41*	PF 1	21.70	1225.58	1225.8		1225.82	0.010247	1.34	16.25	118.08	0.63
1	3580.41*	PF 1	21.70	1225.56	1225.8		1225.80	0.010730	1.35	16.10	119.51	0.65
1	3579.41*	PF 1	21.70	1225.55	1225.8		1225.79	0.010606	1.34	16.23	120.93	0.64
1	3578.41*	PF 1	21.70	1225.54	1225.8		1225.78	0.010391	1.32	16.41	122.35	0.64
1	3577.41*	PF 1	21.70	1225.53	1225.7		1225.77	0.010120	1.31	16.62	123.78	0.63
1	3576.41*	PF 1	21.70	1225.51	1225.7		1225.76	0.010559	1.32	16.48	125.22	0.64
1	3575.41*	PF 1	21.70	1225.50	1225.7		1225.75	0.010355	1.30	16.65	126.64	0.63
1	3574.41*	PF 1	21.70	1225.49	1225.7		1225.74	0.010095	1.29	16.86	128.06	0.63
1	3573.41*	PF 1	21.70	1225.47	1225.7		1225.72	0.010524	1.30	16.72	129.50	0.64
1	3572.41*	PF 1	21.70	1225.46	1225.7		1225.71	0.010360	1.29	16.87	130.92	0.63
1	3571.41*	PF 1	21.70	1225.45	1225.7		1225.70	0.010137	1.27	17.06	132.34	0.62
1	3570.41*	PF 1	21.70	1225.43	1225.7		1225.69	0.010659	1.29	16.88	133.77	0.64
1	3569.41*	PF 1	21.70	1225.42	1225.7		1225.68	0.010467	1.27	17.04	135.20	0.63
1	3568.41*	PF 1	21.70	1225.41	1225.6		1225.67	0.010250	1.26	17.22	136.62	0.63
1	3567.41*	PF 1	21.70	1225.40	1225.6		1225.66	0.010007	1.25	17.42	138.04	0.62

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3566.41*	PF 1	21.70	1225.38	1225.6		1225.65	0.010479	1.26	17.25	139.47	0.63
1	3565.41*	PF 1	21.70	1225.37	1225.6		1225.64	0.010268	1.25	17.42	140.89	0.62
1	3564.41*	PF 1	21.70	1225.36	1225.6		1225.63	0.010031	1.23	17.62	142.31	0.62
1	3563.41*	PF 1	21.70	1225.34	1225.6		1225.61	0.010488	1.24	17.45	143.75	0.63
1	3562.41*	PF 1	21.70	1225.33	1225.6		1225.60	0.010318	1.23	17.61	145.17	0.62
1	3561.41*	PF 1	21.70	1225.32	1225.6		1225.59	0.010116	1.22	17.78	146.60	0.62
1	3560.41*	PF 1	21.70	1225.30	1225.6		1225.58	0.010671	1.24	17.57	148.03	0.63
1	3559.41*	PF 1	21.70	1225.29	1225.5		1225.57	0.010687	1.23	17.63	149.45	0.63
1	3558.41*	PF 1	21.70	1225.28	1225.5		1225.56	0.010669	1.23	17.70	150.86	0.63
1	3557.41*	PF 1	21.70	1225.26	1225.5		1225.55	0.011695	1.26	17.29	152.29	0.66
1	3556.41*	PF 1	21.70	1225.25	1225.5		1225.53	0.012663	1.28	16.94	153.69	0.68
1	3555.41*	PF 1	21.70	1225.24	1225.5		1225.52	0.014234	1.32	16.42	155.08	0.72
1	3554.41*	PF 1	21.70	1225.23	1225.5		1225.51	0.009873	1.18	18.39	156.55	0.61
1	3553.41*	PF 1	21.70	1225.21	1225.5		1225.50	0.010267	1.19	18.24	157.99	0.62
1	3552.41*	PF 1	21.70	1225.20	1225.5		1225.49	0.010050	1.18	18.42	159.41	0.61
1	3551.41*	PF 1	21.70	1225.19	1225.5		1225.48	0.009735	1.16	18.67	160.84	0.60
1	3550.41*	PF 1	21.70	1225.17	1225.4		1225.46	0.010068	1.17	18.55	162.27	0.61
1	3549.41*	PF 1	21.70	1225.16	1225.4		1225.45	0.009789	1.16	18.77	163.69	0.60
1	3548.41*	PF 1	21.70	1225.15	1225.4		1225.44	0.009485	1.14	19.01	165.12	0.59
1	3547.42*	PF 1	21.70	1225.13	1225.4		1225.43	0.009712	1.15	18.94	166.55	0.60
1	3546.42*	PF 1	21.70	1225.12	1225.4		1225.42	0.009314	1.13	19.25	167.98	0.59
1	3545.42*	PF 1	21.70	1225.11	1225.4		1225.41	0.008808	1.10	19.64	169.42	0.57
1	3544.42*	PF 1	21.70	1225.10	1225.4		1225.40	0.008199	1.08	20.14	170.96	0.55
1	3543.42*	PF 1	21.70	1225.08	1225.4		1225.40	0.007546	1.05	20.73	172.55	0.53
1	3542.42*	PF 1	21.70	1225.07	1225.4		1225.39	0.006780	1.01	21.49	174.13	0.51
1	3541.42*	PF 1	21.70	1225.06	1225.4		1225.38	0.011390	0.99	21.93	175.67	0.49
1	3540.42*	PF 1	21.70	1225.04	1225.4		1225.37	0.011966	1.00	21.69	177.20	0.50
1	3539.42*	PF 1	21.70	1225.03	1225.3		1225.35	0.012770	1.02	21.34	178.73	0.52
1	3538.42*	PF 1	21.70	1225.02	1225.3		1225.34	0.014422	1.05	20.63	179.96	0.55
1	3537.42*	PF 1	21.70	1225.00	1225.3		1225.32	0.020187	1.16	18.68	180.90	0.64
1	3537.09	PF 1	21.70	1225.00	1225.3	1225.27600	1225.31	0.049493	1.52	14.28	181.11	0.95
1	3536.09*	PF 1	21.70	1224.19	1224.4	1224.42400	1225.08	6.912236	6.76	3.21	176.26	8.83
1	3535.09*	PF 1	21.70	1223.38	1223.6	1223.58800	1223.70	0.480983	3.07	7.07	171.93	2.67
1	3534.09*	PF 1	21.70	1222.56	1222.7	1222.74300	1222.96	1.250571	4.13	5.25	167.40	4.11
1	3533.09*	PF 1	21.70	1221.75	1221.9	1221.90600	1222.04	0.668361	3.46	6.27	162.98	3.11
1	3532.09*	PF 1	21.70	1220.94	1221.0	1221.04700	1221.24	0.971408	3.92	5.54	158.46	3.69
1	3531.18	PF 1	21.70	1220.20	1220.2	1220.28500	1220.45	0.771985	3.69	5.88	154.41	3.34
1	3530.18*	PF 1	21.70	1220.19	1220.2	1220.27600	1220.47	0.942092	3.92	5.53	154.32	3.65

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3529.18*	PF 1	21.70	1220.18	1220.2	1220.26600	1220.37	0.397513	3.03	7.17	154.28	2.48
1	3528.18*	PF 1	21.70	1220.17	1220.3	1220.25200	1220.32	0.011427	1.04	20.82	154.73	0.50
1	3527.18*	PF 1	21.70	1220.16	1220.3		1220.31	0.012195	1.06	20.41	154.63	0.52
1	3526.18*	PF 1	21.70	1220.15	1220.3		1220.30	0.013622	1.10	19.74	154.52	0.54
1	3525.18*	PF 1	21.70	1220.14	1220.3		1220.28	0.016266	1.16	18.71	154.39	0.59
1	3524.18*	PF 1	21.70	1220.13	1220.2		1220.27	0.009970	1.19	18.23	154.29	0.61
1	3523.18*	PF 1	21.70	1220.12	1220.2		1220.26	0.009948	1.19	18.24	154.20	0.61
1	3522.18*	PF 1	21.70	1220.11	1220.2		1220.25	0.009959	1.19	18.22	154.11	0.61
1	3521.18*	PF 1	21.70	1220.10	1220.2		1220.24	0.009935	1.19	18.23	154.03	0.61
1	3520.18*	PF 1	21.70	1220.09	1220.2		1220.23	0.009947	1.19	18.22	153.94	0.61
1	3519.18*	PF 1	21.70	1220.08	1220.2		1220.22	0.009923	1.19	18.23	153.86	0.61
1	3518.18*	PF 1	21.70	1220.07	1220.2		1220.21	0.009901	1.19	18.24	153.77	0.61
1	3517.18*	PF 1	21.70	1220.06	1220.2		1220.20	0.009947	1.19	18.21	153.68	0.61
1	3516.18*	PF 1	21.70	1220.05	1220.2		1220.19	0.009957	1.19	18.20	153.60	0.61
1	3515.18*	PF 1	21.70	1220.04	1220.2		1220.18	0.009969	1.19	18.19	153.51	0.61
1	3514.18*	PF 1	21.70	1220.03	1220.1		1220.17	0.009947	1.19	18.20	153.42	0.61
1	3513.18*	PF 1	21.70	1220.02	1220.1		1220.16	0.009957	1.19	18.19	153.34	0.61
1	3512.18*	PF 1	21.70	1220.01	1220.1		1220.15	0.009969	1.19	18.18	153.25	0.61
1	3511.18*	PF 1	21.70	1220.00	1220.1		1220.14	0.009945	1.19	18.19	153.18	0.61
1	3510.18*	PF 1	21.70	1219.99	1220.1		1220.13	0.009957	1.19	18.18	153.08	0.61
1	3509.18*	PF 1	21.70	1219.98	1220.1		1220.12	0.009933	1.19	18.19	153.01	0.61
1	3508.18*	PF 1	21.70	1219.97	1220.1		1220.11	0.009911	1.19	18.19	152.92	0.61
1	3507.18*	PF 1	21.70	1219.96	1220.1		1220.10	0.009957	1.19	18.17	152.82	0.61
1	3506.18*	PF 1	21.70	1219.95	1220.1		1220.09	0.009933	1.19	18.17	152.75	0.61
1	3505.18*	PF 1	21.70	1219.94	1220.1		1220.08	0.009911	1.19	18.18	152.66	0.61
1	3504.18*	PF 1	21.70	1219.93	1220.0		1220.07	0.009957	1.20	18.15	152.57	0.61
1	3503.18*	PF 1	21.70	1219.92	1220.0		1220.06	0.009967	1.20	18.14	152.49	0.61
1	3502.18*	PF 1	21.70	1219.91	1220.0		1220.05	0.009944	1.20	18.15	152.41	0.61
1	3501.18*	PF 1	21.70	1219.90	1220.0		1220.04	0.009957	1.20	18.14	152.31	0.61
1	3500.18*	PF 1	21.70	1219.89	1220.0		1220.03	0.009967	1.20	18.13	152.23	0.61
1	3499.18*	PF 1	21.70	1219.88	1220.0		1220.02	0.009944	1.20	18.14	152.15	0.61
1	3498.18*	PF 1	21.70	1219.87	1220.0		1220.01	0.009957	1.20	18.13	152.05	0.61
1	3497.18*	PF 1	21.70	1219.86	1220.0		1220.00	0.009934	1.20	18.14	151.97	0.61
1	3496.18*	PF 1	21.70	1219.85	1220.0		1219.99	0.009911	1.20	18.15	151.89	0.61
1	3495.18*	PF 1	21.70	1219.84	1220.0		1219.98	0.009956	1.20	18.12	151.80	0.61
1	3494.18*	PF 1	21.70	1219.83	1220.0		1219.97	0.009934	1.20	18.12	151.71	0.61
1	3493.18*	PF 1	21.70	1219.82	1219.9		1219.96	0.009911	1.20	18.13	151.63	0.61
1	3492.18*	PF 1	21.70	1219.81	1219.9		1219.95	0.009957	1.20	18.10	151.54	0.61

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3491.18*	PF 1	21.70	1219.80	1219.9		1219.94	0.009969	1.20	18.09	151.45	0.61
1	3490.18*	PF 1	21.70	1219.79	1219.9		1219.93	0.009945	1.20	18.10	151.37	0.61
1	3489.18*	PF 1	21.70	1219.78	1219.9		1219.92	0.009957	1.20	18.09	151.28	0.61
1	3488.18*	PF 1	21.70	1219.77	1219.9		1219.91	0.009968	1.20	18.08	151.20	0.61
1	3487.18*	PF 1	21.70	1219.76	1219.9		1219.90	0.009946	1.20	18.09	151.11	0.61
1	3486.18*	PF 1	21.70	1219.75	1219.9		1219.89	0.009924	1.20	18.10	151.02	0.61
1	3485.18*	PF 1	21.70	1219.74	1219.9		1219.88	0.009968	1.20	18.07	150.94	0.61
1	3484.18*	PF 1	21.70	1219.73	1219.9		1219.87	0.009947	1.20	18.08	150.85	0.61
1	3483.18*	PF 1	21.70	1219.72	1219.8		1219.86	0.009925	1.20	18.08	150.76	0.61
1	3482.18*	PF 1	21.70	1219.71	1219.8		1219.85	0.009935	1.20	18.07	150.68	0.61
1	3481.18*	PF 1	21.70	1219.70	1219.8		1219.84	0.009914	1.20	18.08	150.59	0.61
1	3480.18*	PF 1	21.70	1219.69	1219.8		1219.83	0.009926	1.20	18.07	150.50	0.61
1	3479.18*	PF 1	21.70	1219.68	1219.8		1219.82	0.009970	1.20	18.04	150.42	0.61
1	3478.18*	PF 1	21.70	1219.67	1219.8		1219.81	0.009947	1.20	18.05	150.34	0.61
1	3477.18*	PF 1	21.70	1219.66	1219.8		1219.80	0.009959	1.20	18.04	150.25	0.61
1	3476.18*	PF 1	21.70	1219.65	1219.8		1219.79	0.009971	1.20	18.03	150.16	0.61
1	3475.18*	PF 1	21.70	1219.64	1219.8		1219.78	0.009948	1.20	18.04	150.08	0.61
1	3474.18*	PF 1	21.70	1219.63	1219.8		1219.77	0.009926	1.20	18.05	149.99	0.61
1	3473.18*	PF 1	21.70	1219.62	1219.7		1219.76	0.009972	1.20	18.02	149.90	0.61
1	3472.18*	PF 1	21.70	1219.61	1219.7		1219.75	0.009949	1.20	18.03	149.82	0.61
1	3471.18*	PF 1	21.70	1219.60	1219.7		1219.74	0.009926	1.20	18.03	149.74	0.61
1	3470.18*	PF 1	21.70	1219.59	1219.7		1219.73	0.009939	1.20	18.02	149.64	0.61
1	3469.18*	PF 1	21.70	1219.58	1219.7		1219.72	0.009916	1.20	18.03	149.57	0.61
1	3468.18*	PF 1	21.70	1219.57	1219.7		1219.71	0.009894	1.20	18.04	149.49	0.61
1	3467.18*	PF 1	21.70	1219.56	1219.7		1219.70	0.009907	1.20	18.03	149.39	0.61
1	3466.18*	PF 1	21.70	1219.55	1219.7		1219.69	0.009918	1.20	18.02	149.31	0.61
1	3465.18*	PF 1	21.70	1219.54	1219.7		1219.68	0.009895	1.20	18.03	149.23	0.61
1	3464.18*	PF 1	21.70	1219.53	1219.7		1219.67	0.009874	1.20	18.03	149.14	0.61
1	3463.18*	PF 1	21.70	1219.52	1219.6		1219.66	0.009886	1.20	18.02	149.05	0.61
1	3462.18*	PF 1	21.70	1219.51	1219.6		1219.65	0.009863	1.20	18.03	148.97	0.61
1	3461.18*	PF 1	21.70	1219.50	1219.6		1219.64	0.009809	1.20	18.06	148.88	0.61
1	3460.18*	PF 1	21.70	1219.49	1219.6		1219.63	0.009788	1.20	18.06	148.79	0.61
1	3459.18*	PF 1	21.70	1219.48	1219.6		1219.62	0.009766	1.20	18.07	148.71	0.61
1	3458.18*	PF 1	21.70	1219.47	1219.6		1219.61	0.009713	1.20	18.10	148.62	0.61
1	3457.18*	PF 1	21.70	1219.46	1219.6		1219.61	0.009628	1.20	18.14	148.54	0.60
1	3456.18*	PF 1	21.70	1219.45	1219.6		1219.60	0.009512	1.19	18.20	148.46	0.60
1	3455.18*	PF 1	21.70	1219.44	1219.6		1219.59	0.009367	1.19	18.28	148.37	0.60
1	3454.18*	PF 1	21.70	1219.43	1219.6		1219.58	0.009225	1.18	18.36	148.29	0.59

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3453.18*	PF 1	21.70	1219.42	1219.5		1219.57	0.009027	1.17	18.48	148.21	0.59
1	3452.18*	PF 1	21.70	1219.41	1219.5		1219.56	0.008750	1.16	18.65	148.13	0.58
1	3451.18*	PF 1	21.70	1219.40	1219.5		1219.55	0.008402	1.15	18.87	148.06	0.57
1	3450.18*	PF 1	21.70	1219.39	1219.5		1219.54	0.007972	1.13	19.17	147.98	0.55
1	3449.18*	PF 1	21.70	1219.38	1219.5		1219.53	0.007524	1.11	19.50	147.90	0.54
1	3448.18*	PF 1	21.70	1219.37	1219.5		1219.52	0.006981	1.09	19.94	147.84	0.52
1	3447.18*	PF 1	21.70	1219.36	1219.5		1219.52	0.006393	1.06	20.47	147.78	0.50
1	3446.18*	PF 1	21.70	1219.35	1219.5		1219.51	0.005786	1.03	21.09	147.71	0.48
1	3445.18*	PF 1	21.70	1219.34	1219.5		1219.50	0.005208	1.00	21.76	147.66	0.46
1	3444.18*	PF 1	21.70	1219.33	1219.5		1219.50	0.004592	0.96	22.60	147.61	0.43
1	3443.18*	PF 1	21.70	1219.32	1219.5		1219.49	0.004017	0.92	23.52	147.56	0.41
1	3442.18*	PF 1	21.70	1219.31	1219.5		1219.49	0.003515	0.89	24.48	147.51	0.38
1	3441.18*	PF 1	21.70	1219.30	1219.5		1219.49	0.003055	0.85	25.53	147.47	0.36
1	3440.63	PF 1	33.80	1219.29	1219.4		1219.48	0.010671	1.48	22.87	147.31	0.66
1	3366.51	PF 1	33.80	1218.55	1218.7		1218.75	0.009080	1.42	23.86	145.08	0.62
1	3305.78	PF 1	33.80	1217.94	1218.2		1218.20	0.009042	1.69	20.02	93.20	0.64
1	3304.78*	PF 1	33.80	1217.93	1218.1		1218.19	0.009048	1.69	19.98	92.82	0.64
1	3303.78*	PF 1	33.80	1217.92	1218.1		1218.18	0.009037	1.69	19.96	92.45	0.64
1	3302.78*	PF 1	33.80	1217.91	1218.1		1218.17	0.009027	1.70	19.93	92.08	0.64
1	3301.78*	PF 1	33.80	1217.90	1218.1		1218.16	0.009017	1.70	19.91	91.71	0.64
1	3300.78*	PF 1	33.80	1217.89	1218.1		1218.15	0.009009	1.70	19.88	91.33	0.64
1	3299.78*	PF 1	33.80	1217.88	1218.1		1218.15	0.008999	1.70	19.85	90.97	0.64
1	3298.78*	PF 1	33.80	1217.87	1218.1		1218.14	0.008992	1.70	19.83	90.59	0.64
1	3297.78*	PF 1	33.80	1217.86	1218.1		1218.13	0.008984	1.71	19.80	90.23	0.64
1	3296.78*	PF 1	33.80	1217.85	1218.1		1218.12	0.008978	1.71	19.77	89.85	0.64
1	3295.78*	PF 1	33.80	1217.84	1218.1		1218.11	0.008954	1.71	19.75	89.49	0.64
1	3294.78*	PF 1	33.80	1217.83	1218.1		1218.10	0.008933	1.71	19.73	89.11	0.64
1	3293.78*	PF 1	33.80	1217.82	1218.0		1218.09	0.008911	1.71	19.72	88.74	0.64
1	3292.78*	PF 1	33.80	1217.81	1218.0		1218.08	0.008924	1.72	19.68	88.37	0.64
1	3291.78*	PF 1	33.80	1217.80	1218.0		1218.07	0.008902	1.72	19.66	88.00	0.64
1	3290.78*	PF 1	33.80	1217.79	1218.0		1218.06	0.008900	1.72	19.62	87.62	0.64
1	3289.78*	PF 1	33.80	1217.78	1218.0		1218.05	0.008880	1.72	19.60	87.26	0.64
1	3288.78*	PF 1	33.80	1217.77	1218.0		1218.04	0.008879	1.73	19.57	86.88	0.64
1	3287.78*	PF 1	33.80	1217.76	1218.0		1218.03	0.008860	1.73	19.55	86.52	0.64
1	3286.78*	PF 1	33.80	1217.75	1218.0		1218.03	0.008860	1.73	19.52	86.14	0.64
1	3285.78*	PF 1	33.80	1217.74	1218.0		1218.02	0.008843	1.73	19.50	85.77	0.64
1	3284.78*	PF 1	33.80	1217.73	1218.0		1218.01	0.008828	1.74	19.47	85.40	0.64
1	3283.78*	PF 1	33.80	1217.72	1218.0		1218.00	0.008812	1.74	19.45	85.03	0.64

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3282.78*	PF 1	33.80	1217.71	1217.9		1217.99	0.008799	1.74	19.42	84.66	0.64
1	3281.78*	PF 1	33.80	1217.70	1217.9		1217.98	0.008787	1.74	19.40	84.28	0.64
1	3280.78*	PF 1	33.80	1217.69	1217.9		1217.97	0.008760	1.74	19.38	83.91	0.64
1	3279.78*	PF 1	33.80	1217.68	1217.9		1217.96	0.008762	1.75	19.35	83.54	0.64
1	3278.78*	PF 1	33.80	1217.67	1217.9		1217.95	0.008751	1.75	19.32	83.17	0.64
1	3277.78*	PF 1	33.80	1217.66	1217.9		1217.94	0.008739	1.75	19.29	82.80	0.64
1	3276.78*	PF 1	33.80	1217.65	1217.9		1217.93	0.008700	1.75	19.28	82.43	0.64
1	3275.78*	PF 1	33.80	1217.64	1217.9		1217.93	0.008674	1.75	19.27	82.06	0.64
1	3274.78*	PF 1	33.80	1217.63	1217.9		1217.92	0.008637	1.76	19.26	81.69	0.64
1	3273.78*	PF 1	33.80	1217.62	1217.9		1217.91	0.008584	1.76	19.26	81.32	0.64
1	3272.78*	PF 1	33.80	1217.61	1217.9		1217.90	0.008549	1.76	19.24	80.95	0.64
1	3271.78*	PF 1	33.80	1217.60	1217.8		1217.89	0.008512	1.76	19.23	80.59	0.63
1	3270.78*	PF 1	33.80	1217.59	1217.8		1217.88	0.008479	1.76	19.22	80.21	0.63
1	3269.78*	PF 1	33.80	1217.58	1217.8		1217.87	0.008419	1.76	19.23	79.84	0.63
1	3268.78*	PF 1	33.80	1217.57	1217.8		1217.86	0.008371	1.76	19.22	79.48	0.63
1	3267.78*	PF 1	33.80	1217.56	1217.8		1217.85	0.008314	1.76	19.23	79.10	0.63
1	3266.78*	PF 1	33.80	1217.55	1217.8		1217.85	0.008228	1.76	19.25	78.74	0.63
1	3265.78*	PF 1	33.80	1217.54	1217.8		1217.84	0.008160	1.75	19.26	78.37	0.62
1	3264.78*	PF 1	33.80	1217.53	1217.8		1217.83	0.008079	1.75	19.29	78.01	0.62
1	3263.78*	PF 1	33.80	1217.52	1217.8		1217.82	0.008002	1.75	19.31	77.64	0.62
1	3262.78*	PF 1	33.80	1217.51	1217.8		1217.81	0.007912	1.75	19.34	77.28	0.62
1	3261.78*	PF 1	33.80	1217.50	1217.8		1217.80	0.007814	1.74	19.37	76.91	0.61
1	3260.78*	PF 1	33.80	1217.49	1217.7		1217.79	0.007704	1.74	19.42	76.55	0.61
1	3259.78*	PF 1	33.80	1217.48	1217.7		1217.79	0.007576	1.74	19.48	76.18	0.61
1	3258.78*	PF 1	33.80	1217.47	1217.7		1217.78	0.007449	1.73	19.54	75.82	0.60
1	3257.78*	PF 1	33.80	1217.46	1217.7		1217.77	0.013656	1.75	19.32	75.43	0.61
1	3256.78*	PF 1	33.80	1217.44	1217.7		1217.75	0.012624	1.71	19.75	75.10	0.59
1	3255.78*	PF 1	33.80	1217.43	1217.7		1217.74	0.013762	1.76	19.20	74.69	0.61
1	3254.78*	PF 1	33.80	1217.42	1217.7		1217.72	0.015520	1.83	18.48	74.27	0.65
1	3253.78*	PF 1	33.80	1217.41	1217.6		1217.71	0.019770	1.97	17.14	73.79	0.72
1	3253.32	PF 1	33.80	1217.41	1217.6	1217.59900	1217.69	0.040833	2.46	13.75	73.34	1.00
1	3252.32*	PF 1	33.80	1216.12	1216.2	1216.31800	1217.45	2.831095	9.06	3.73	67.66	6.80
1	3251.32*	PF 1	33.80	1214.83	1214.9	1215.03800	1215.66	1.066496	6.96	4.86	62.93	4.41
1	3250.32*	PF 1	33.80	1213.54	1213.6	1213.76000	1214.50	1.241629	7.52	4.50	58.05	4.76
1	3250.17	PF 1	33.80	1213.35	1213.4	1213.57100	1214.30	1.214600	7.51	4.50	57.34	4.72
1	3249.17*	PF 1	33.80	1213.34	1213.5	1213.56200	1213.76	0.178697	4.22	8.01	57.41	1.99
1	3248.17*	PF 1	33.80	1213.33	1213.7	1213.55200	1213.70	0.011299	1.83	18.44	58.21	0.57
1	3247.17*	PF 1	33.80	1213.32	1213.6		1213.69	0.011789	1.86	18.17	57.89	0.59

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3246.17*	PF 1	33.80	1213.31	1213.6		1213.68	0.012428	1.89	17.84	57.58	0.60
1	3245.17*	PF 1	33.80	1213.30	1213.6		1213.67	0.013248	1.94	17.47	57.26	0.62
1	3244.17*	PF 1	33.80	1213.29	1213.6		1213.66	0.014160	1.98	17.08	56.93	0.64
1	3243.17*	PF 1	33.80	1213.28	1213.6		1213.65	0.008183	2.00	16.91	56.62	0.65
1	3242.17*	PF 1	33.80	1213.27	1213.6		1213.64	0.008159	2.00	16.89	56.34	0.64
1	3241.17*	PF 1	33.80	1213.26	1213.6		1213.63	0.008151	2.01	16.86	56.05	0.64
1	3240.17*	PF 1	33.80	1213.25	1213.6		1213.62	0.008126	2.01	16.84	55.77	0.64
1	3239.17*	PF 1	33.80	1213.24	1213.5		1213.61	0.008120	2.01	16.81	55.48	0.64
1	3238.17*	PF 1	33.80	1213.23	1213.5		1213.60	0.008114	2.01	16.78	55.19	0.64
1	3237.17*	PF 1	33.80	1213.22	1213.5		1213.59	0.008095	2.02	16.75	54.90	0.64
1	3236.17*	PF 1	33.80	1213.21	1213.5		1213.59	0.008069	2.02	16.73	54.61	0.64
1	3235.17*	PF 1	33.80	1213.20	1213.5		1213.58	0.008056	2.02	16.71	54.32	0.64
1	3234.17*	PF 1	33.80	1213.19	1213.5		1213.57	0.008040	2.03	16.68	54.04	0.64
1	3233.17*	PF 1	33.80	1213.18	1213.5		1213.56	0.008025	2.03	16.66	53.75	0.64
1	3232.17*	PF 1	33.80	1213.17	1213.5		1213.55	0.008014	2.03	16.63	53.46	0.64
1	3231.17*	PF 1	33.80	1213.16	1213.5		1213.54	0.007990	2.04	16.61	53.18	0.64
1	3230.17*	PF 1	33.80	1213.15	1213.5		1213.53	0.007981	2.04	16.58	52.89	0.64
1	3229.17*	PF 1	33.80	1213.14	1213.5		1213.53	0.007960	2.04	16.55	52.60	0.64
1	3228.17*	PF 1	33.80	1213.13	1213.5		1213.52	0.007942	2.04	16.53	52.31	0.64
1	3227.17*	PF 1	33.80	1213.12	1213.4		1213.51	0.007923	2.05	16.50	52.03	0.64
1	3226.17*	PF 1	33.80	1213.11	1213.4		1213.50	0.007905	2.05	16.48	51.75	0.64
1	3225.17*	PF 1	33.80	1213.10	1213.4		1213.49	0.007891	2.05	16.45	51.46	0.64
1	3224.17*	PF 1	33.80	1213.09	1213.4		1213.48	0.007887	2.06	16.42	51.16	0.64
1	3223.17*	PF 1	33.80	1213.08	1213.4		1213.47	0.007872	2.06	16.39	50.88	0.64
1	3222.17*	PF 1	33.80	1213.07	1213.4		1213.47	0.007871	2.07	16.35	50.59	0.64
1	3221.17*	PF 1	33.80	1213.06	1213.4		1213.46	0.007870	2.07	16.32	50.30	0.64
1	3220.17*	PF 1	33.80	1213.05	1213.4		1213.45	0.007855	2.07	16.29	50.02	0.64
1	3219.17*	PF 1	33.80	1213.04	1213.4		1213.44	0.007846	2.08	16.26	49.73	0.64
1	3218.17*	PF 1	33.80	1213.03	1213.4		1213.43	0.007849	2.08	16.22	49.44	0.64
1	3217.17*	PF 1	33.80	1213.02	1213.4		1213.42	0.007840	2.09	16.19	49.16	0.64
1	3216.17*	PF 1	33.80	1213.01	1213.3		1213.42	0.007844	2.09	16.15	48.87	0.64
1	3215.17*	PF 1	33.80	1213.00	1213.3		1213.41	0.007849	2.10	16.10	48.57	0.64
1	3214.17*	PF 1	33.80	1212.99	1213.3		1213.40	0.007840	2.10	16.07	48.30	0.64
1	3213.17*	PF 1	33.80	1212.98	1213.3		1213.39	0.007847	2.11	16.03	48.01	0.64
1	3212.17*	PF 1	33.80	1212.97	1213.3		1213.38	0.007852	2.11	15.99	47.72	0.64
1	3211.17*	PF 1	33.80	1212.96	1213.3		1213.37	0.007861	2.12	15.94	47.43	0.64
1	3210.17*	PF 1	33.80	1212.95	1213.3		1213.37	0.007871	2.13	15.90	47.14	0.65
1	3209.17*	PF 1	33.80	1212.94	1213.3		1213.36	0.007879	2.13	15.86	46.86	0.65

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3208.17*	PF 1	33.80	1212.93	1213.3		1213.35	0.007897	2.14	15.81	46.57	0.65
1	3207.17*	PF 1	33.80	1212.92	1213.3		1213.34	0.007920	2.15	15.75	46.28	0.65
1	3206.17*	PF 1	33.80	1212.91	1213.3		1213.33	0.007931	2.15	15.71	46.00	0.65
1	3205.17*	PF 1	33.80	1212.90	1213.3		1213.32	0.007965	2.16	15.65	45.70	0.65
1	3204.17*	PF 1	33.80	1212.89	1213.2		1213.32	0.008000	2.17	15.59	45.41	0.65
1	3203.17*	PF 1	33.80	1212.88	1213.2		1213.31	0.008033	2.18	15.53	45.13	0.65
1	3202.17*	PF 1	33.80	1212.87	1213.2		1213.30	0.008070	2.19	15.47	44.83	0.66
1	3201.17*	PF 1	33.80	1212.86	1213.2		1213.29	0.008114	2.19	15.40	44.55	0.66
1	3200.17*	PF 1	33.80	1212.85	1213.2		1213.28	0.008159	2.20	15.34	44.26	0.66
1	3199.17*	PF 1	33.80	1212.84	1213.2		1213.27	0.008228	2.22	15.26	43.96	0.66
1	3198.17*	PF 1	33.80	1212.83	1213.2		1213.26	0.008295	2.23	15.18	43.68	0.67
1	3197.17*	PF 1	33.80	1212.82	1213.2		1213.26	0.008377	2.24	15.10	43.38	0.67
1	3196.17*	PF 1	33.80	1212.81	1213.2		1213.25	0.008479	2.25	15.00	43.08	0.67
1	3195.17*	PF 1	33.80	1212.80	1213.2		1213.24	0.008576	2.27	14.91	42.80	0.68
1	3194.17*	PF 1	33.80	1212.79	1213.1		1213.23	0.008703	2.28	14.80	42.50	0.68
1	3193.17*	PF 1	33.80	1212.78	1213.1		1213.22	0.008833	2.30	14.70	42.20	0.69
1	3192.17*	PF 1	33.80	1212.77	1213.1		1213.21	0.008971	2.32	14.59	41.91	0.69
1	3191.17*	PF 1	33.80	1212.76	1213.1		1213.20	0.009149	2.34	14.46	41.61	0.70
1	3190.17*	PF 1	33.80	1212.75	1213.1		1213.19	0.009342	2.36	14.33	41.31	0.71
1	3189.17*	PF 1	33.80	1212.74	1213.1		1213.18	0.009568	2.38	14.18	41.01	0.71
1	3188.17*	PF 1	33.80	1212.73	1213.1		1213.17	0.009824	2.41	14.03	40.71	0.72
1	3187.17*	PF 1	33.80	1212.72	1213.1		1213.17	0.010152	2.44	13.85	40.40	0.73
1	3186.18	PF 1	33.80	1212.71	1213.1		1213.16	0.010537	2.47	13.66	40.10	0.75
1	3091.83	PF 1	33.80	1211.75	1212.1		1212.13	0.011198	2.32	14.57	49.41	0.75
1	3030.37	PF 1	33.80	1211.13	1211.4		1211.45	0.010915	2.06	16.44	65.55	0.72
1	3029.37*	PF 1	33.80	1211.12	1211.4		1211.44	0.010909	2.05	16.47	65.84	0.72
1	3028.37*	PF 1	33.80	1211.11	1211.4		1211.43	0.010919	2.05	16.49	66.13	0.72
1	3027.37*	PF 1	33.80	1211.10	1211.4		1211.42	0.010933	2.05	16.52	66.43	0.72
1	3026.37*	PF 1	33.80	1211.09	1211.3		1211.41	0.010948	2.04	16.54	66.72	0.72
1	3025.37*	PF 1	33.80	1211.08	1211.3		1211.40	0.010960	2.04	16.56	67.03	0.72
1	3024.37*	PF 1	33.80	1211.07	1211.3		1211.38	0.010977	2.04	16.59	67.33	0.72
1	3023.37*	PF 1	33.80	1211.06	1211.3		1211.37	0.011030	2.04	16.59	67.62	0.73
1	3022.37*	PF 1	33.80	1211.05	1211.3		1211.36	0.011085	2.04	16.60	67.92	0.73
1	3021.37*	PF 1	33.80	1211.04	1211.3		1211.35	0.011120	2.03	16.61	68.23	0.73
1	3020.37*	PF 1	33.80	1211.03	1211.3		1211.34	0.011177	2.03	16.61	68.53	0.73
1	3019.37*	PF 1	33.80	1211.02	1211.3		1211.33	0.011274	2.04	16.60	68.84	0.73
1	3018.37*	PF 1	33.80	1211.01	1211.3		1211.32	0.011408	2.04	16.57	69.14	0.73
1	3017.37*	PF 1	33.80	1211.00	1211.2		1211.31	0.011511	2.04	16.56	69.45	0.74

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3016.37*	PF 1	33.80	1210.98	1211.2		1211.29	0.009575	1.93	17.54	69.84	0.68
1	3015.37*	PF 1	33.80	1210.97	1211.2		1211.28	0.009361	1.91	17.69	70.17	0.67
1	3014.37*	PF 1	33.80	1210.96	1211.2		1211.27	0.009126	1.89	17.86	70.49	0.66
1	3013.37*	PF 1	33.80	1210.95	1211.2		1211.26	0.008870	1.87	18.04	70.82	0.65
1	3012.37*	PF 1	33.80	1210.94	1211.2		1211.25	0.008592	1.85	18.25	71.15	0.64
1	3011.37*	PF 1	33.80	1210.93	1211.2		1211.24	0.008315	1.83	18.46	71.48	0.63
1	3010.37*	PF 1	33.80	1210.92	1211.2		1211.23	0.007998	1.81	18.72	71.81	0.62
1	3009.37*	PF 1	33.80	1210.91	1211.2		1211.23	0.007661	1.78	18.99	72.14	0.61
1	3008.37*	PF 1	33.80	1210.90	1211.2		1211.22	0.013635	1.78	19.02	72.46	0.61
1	3007.37*	PF 1	33.80	1210.89	1211.2		1211.20	0.014556	1.81	18.68	72.74	0.63
1	3006.37*	PF 1	33.80	1210.88	1211.1		1211.19	0.016076	1.86	18.16	73.01	0.66
1	3005.37*	PF 1	33.80	1210.87	1211.1		1211.17	0.019329	1.96	17.20	73.25	0.71
1	3004.37*	PF 1	33.80	1210.86	1211.1		1211.15	0.029979	2.24	15.09	73.39	0.87
1	3004.33	PF 1	33.80	1210.86	1211.1	1211.06500	1211.15	0.031241	2.27	14.91	73.39	0.89
1	3003.33*	PF 1	33.80	1210.01	1210.1	1210.20800	1210.97	1.563808	7.56	4.47	67.99	5.20
1	3002.33*	PF 1	33.80	1209.17	1209.3	1209.37600	1209.85	0.725106	6.17	5.48	63.55	3.71
1	3001.33*	PF 1	33.80	1208.32	1208.4	1208.53700	1209.07	0.796874	6.54	5.17	58.99	3.89
1	3000.32*	PF 1	33.80	1207.47	1207.6	1207.70000	1208.27	0.793117	6.74	5.01	54.46	3.92
1	2999.32*	PF 1	33.80	1206.62	1206.7	1206.86300	1207.47	0.784191	6.96	4.86	49.92	3.93
1	2998.41	PF 1	33.80	1205.85	1206.0	1206.10700	1206.75	0.773182	7.17	4.71	45.79	3.94
1	2997.41*	PF 1	33.80	1205.84	1206.0	1206.09400	1206.31	0.158561	4.43	7.64	46.59	1.93
1	2996.41*	PF 1	33.80	1205.83	1206.2	1206.08300	1206.24	0.014684	2.14	15.79	48.04	0.66
1	2995.41*	PF 1	33.80	1205.82	1206.1		1206.22	0.015360	2.16	15.63	48.45	0.67
1	2994.41*	PF 1	33.80	1205.81	1206.1		1206.21	0.016404	2.20	15.37	48.83	0.69
1	2993.41*	PF 1	33.80	1205.80	1206.1		1206.19	0.018075	2.26	14.98	49.19	0.72
1	2992.41*	PF 1	33.80	1205.79	1206.1		1206.17	0.020054	2.32	14.56	49.55	0.76
1	2991.41*	PF 1	33.80	1205.78	1206.1		1206.16	0.011719	2.34	14.44	49.97	0.77
1	2990.41*	PF 1	33.80	1205.77	1206.1		1206.15	0.011708	2.33	14.49	50.39	0.77
1	2989.41*	PF 1	33.80	1205.76	1206.1		1206.14	0.011687	2.32	14.55	50.80	0.77
1	2988.41*	PF 1	33.80	1205.75	1206.0		1206.12	0.011681	2.32	14.60	51.22	0.76
1	2987.41*	PF 1	33.80	1205.74	1206.0		1206.11	0.011673	2.31	14.65	51.65	0.76
1	2986.41*	PF 1	33.80	1205.73	1206.0		1206.10	0.011656	2.30	14.70	52.07	0.76
1	2985.41*	PF 1	33.80	1205.72	1206.0		1206.09	0.011625	2.29	14.76	52.50	0.76
1	2984.41*	PF 1	33.80	1205.71	1206.0		1206.08	0.011596	2.28	14.82	52.92	0.76
1	2983.41*	PF 1	33.80	1205.70	1206.0		1206.06	0.011586	2.27	14.87	53.34	0.76
1	2982.41*	PF 1	33.80	1205.69	1206.0		1206.05	0.011558	2.26	14.93	53.77	0.76
1	2981.41*	PF 1	33.80	1205.68	1206.0		1206.04	0.011553	2.26	14.98	54.19	0.76
1	2980.41*	PF 1	33.80	1205.67	1206.0		1206.03	0.011534	2.25	15.03	54.62	0.76

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2979.41*	PF 1	33.80	1205.66	1205.9		1206.02	0.011500	2.24	15.09	55.04	0.75
1	2978.41*	PF 1	33.80	1205.65	1205.9		1206.01	0.011481	2.23	15.15	55.47	0.75
1	2977.41*	PF 1	33.80	1205.64	1205.9		1205.99	0.011468	2.22	15.20	55.90	0.75
1	2976.41*	PF 1	33.80	1205.63	1205.9		1205.98	0.011458	2.22	15.25	56.32	0.75
1	2975.41*	PF 1	33.80	1205.62	1205.9		1205.97	0.011449	2.21	15.30	56.74	0.75
1	2974.41*	PF 1	33.80	1205.61	1205.9		1205.96	0.011405	2.20	15.36	57.17	0.75
1	2973.41*	PF 1	33.80	1205.60	1205.9		1205.95	0.011383	2.19	15.42	57.60	0.75
1	2972.41*	PF 1	33.80	1205.59	1205.9		1205.94	0.011368	2.19	15.47	58.01	0.75
1	2971.41*	PF 1	33.80	1205.58	1205.8		1205.92	0.011351	2.18	15.52	58.44	0.75
1	2970.41*	PF 1	33.80	1205.57	1205.8		1205.91	0.011353	2.17	15.56	58.86	0.74
1	2969.41*	PF 1	33.80	1205.56	1205.8		1205.90	0.011335	2.16	15.62	59.29	0.74
1	2968.41*	PF 1	33.80	1205.55	1205.8		1205.89	0.011306	2.16	15.67	59.72	0.74
1	2967.41*	PF 1	33.80	1205.54	1205.8		1205.88	0.011279	2.15	15.73	60.14	0.74
1	2966.41*	PF 1	33.80	1205.53	1205.8		1205.87	0.011254	2.14	15.78	60.56	0.74
1	2965.41*	PF 1	33.80	1205.52	1205.8		1205.85	0.011227	2.13	15.84	61.00	0.74
1	2964.41*	PF 1	33.80	1205.51	1205.8		1205.84	0.011188	2.13	15.90	61.42	0.74
1	2963.41*	PF 1	33.80	1205.50	1205.8		1205.83	0.011150	2.12	15.96	61.85	0.74
1	2962.41*	PF 1	33.80	1205.49	1205.8		1205.82	0.011114	2.11	16.02	62.27	0.73
1	2961.41*	PF 1	33.80	1205.48	1205.7		1205.81	0.011076	2.10	16.08	62.71	0.73
1	2960.41*	PF 1	33.80	1205.47	1205.7		1205.80	0.011009	2.09	16.15	63.13	0.73
1	2959.41*	PF 1	33.80	1205.46	1205.7		1205.79	0.010943	2.08	16.23	63.56	0.73
1	2958.41*	PF 1	33.80	1205.45	1205.7		1205.78	0.010862	2.07	16.31	63.99	0.72
1	2957.41*	PF 1	33.80	1205.44	1205.7		1205.76	0.010765	2.06	16.39	64.42	0.72
1	2956.41*	PF 1	33.80	1205.43	1205.7		1205.75	0.010684	2.05	16.47	64.85	0.72
1	2955.41*	PF 1	33.80	1205.42	1205.7		1205.74	0.010578	2.04	16.57	65.27	0.71
1	2955.4	PF 1	33.80	1205.42	1205.7		1205.74	0.010591	2.04	16.56	65.28	0.71
1	2914.65	PF 1	33.80	1205.01	1205.2		1205.30	0.010520	1.91	17.66	76.28	0.70
1	2815.59	PF 1	33.80	1204.02	1204.2		1204.25	0.010565	1.65	20.46	110.60	0.68
1	2782.59	PF 1	33.80	1203.69	1203.9		1203.91	0.010055	1.57	21.50	120.68	0.66
1	2743.58	PF 1	33.80	1203.30	1203.5		1203.51	0.010166	1.55	21.80	125.91	0.66
1	2742.58*	PF 1	33.80	1203.29	1203.5		1203.50	0.010167	1.55	21.81	126.05	0.66
1	2741.58*	PF 1	33.80	1203.28	1203.5		1203.49	0.010192	1.55	21.80	126.19	0.66
1	2740.58*	PF 1	33.80	1203.27	1203.4		1203.48	0.010168	1.55	21.83	126.34	0.66
1	2739.58*	PF 1	33.80	1203.26	1203.4		1203.47	0.010193	1.55	21.82	126.48	0.66
1	2738.58*	PF 1	33.80	1203.25	1203.4		1203.46	0.010220	1.55	21.81	126.61	0.66
1	2737.58*	PF 1	33.80	1203.24	1203.4		1203.45	0.010245	1.55	21.80	126.75	0.66
1	2736.58*	PF 1	33.80	1203.23	1203.4		1203.44	0.010295	1.55	21.78	126.89	0.66
1	2735.58*	PF 1	33.80	1203.22	1203.4		1203.43	0.010370	1.55	21.74	127.02	0.66

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2734.58*	PF 1	33.80	1203.21	1203.4		1203.42	0.010493	1.56	21.68	127.17	0.67
1	2733.58*	PF 1	33.80	1203.20	1203.4		1203.41	0.010647	1.57	21.59	127.30	0.67
1	2732.58*	PF 1	33.80	1203.19	1203.4		1203.40	0.010855	1.57	21.47	127.44	0.68
1	2731.58*	PF 1	33.80	1203.18	1203.3		1203.39	0.011286	1.59	21.23	127.56	0.69
1	2730.58*	PF 1	33.80	1203.17	1203.3		1203.38	0.011916	1.62	20.90	127.69	0.70
1	2729.58*	PF 1	33.80	1203.16	1203.3		1203.36	0.012659	1.65	20.53	127.80	0.72
1	2728.58*	PF 1	33.80	1203.14	1203.3		1203.35	0.010018	1.53	22.04	128.02	0.65
1	2727.58*	PF 1	33.80	1203.13	1203.3		1203.34	0.009972	1.53	22.08	128.16	0.65
1	2726.58*	PF 1	33.80	1203.12	1203.3		1203.33	0.009950	1.53	22.10	128.30	0.65
1	2725.58*	PF 1	33.80	1203.11	1203.3		1203.32	0.009905	1.53	22.14	128.44	0.65
1	2724.58*	PF 1	33.80	1203.10	1203.3		1203.31	0.009860	1.52	22.18	128.58	0.65
1	2723.58*	PF 1	33.80	1203.09	1203.3		1203.30	0.009792	1.52	22.24	128.72	0.64
1	2722.58*	PF 1	33.80	1203.08	1203.3		1203.29	0.009724	1.52	22.30	128.87	0.64
1	2721.58*	PF 1	33.80	1203.07	1203.2		1203.28	0.009612	1.51	22.38	129.01	0.64
1	2720.58*	PF 1	33.80	1203.06	1203.2		1203.27	0.009526	1.51	22.45	129.15	0.64
1	2719.58*	PF 1	33.80	1203.05	1203.2		1203.26	0.009395	1.50	22.56	129.29	0.63
1	2718.57*	PF 1	33.80	1203.04	1203.2		1203.25	0.009245	1.49	22.68	129.44	0.63
1	2717.57*	PF 1	33.80	1203.03	1203.2		1203.24	0.009077	1.48	22.81	129.58	0.62
1	2716.57*	PF 1	33.80	1203.02	1203.2		1203.23	0.008850	1.47	23.00	129.74	0.62
1	2715.57*	PF 1	33.80	1203.01	1203.2		1203.22	0.008593	1.46	23.21	129.89	0.61
1	2714.57*	PF 1	33.80	1203.00	1203.2		1203.21	0.008289	1.44	23.47	130.04	0.60
1	2713.57*	PF 1	33.80	1202.99	1203.2		1203.21	0.007945	1.42	23.79	130.19	0.59
1	2712.57*	PF 1	33.80	1202.98	1203.2		1203.20	0.007586	1.40	24.13	130.35	0.57
1	2711.57*	PF 1	33.80	1202.97	1203.2		1203.19	0.007201	1.38	24.52	130.49	0.56
1	2710.57*	PF 1	33.80	1202.96	1203.2		1203.18	0.006782	1.35	24.98	130.66	0.55
1	2709.57*	PF 1	33.80	1202.95	1203.1		1203.17	0.011853	1.35	25.12	130.81	0.54
1	2708.57*	PF 1	33.80	1202.94	1203.1		1203.16	0.012501	1.37	24.73	130.93	0.55
1	2707.57*	PF 1	33.80	1202.93	1203.1		1203.15	0.013578	1.40	24.13	131.04	0.58
1	2706.57*	PF 1	33.80	1202.92	1203.1		1203.13	0.015539	1.46	23.18	131.13	0.61
1	2705.57*	PF 1	33.80	1202.91	1203.1		1203.11	0.021734	1.61	20.96	131.17	0.71
1	2704.94	PF 1	33.80	1202.90	1203.0	1203.02800	1203.09	0.046149	2.02	16.72	131.07	1.00
1	2703.94*	PF 1	33.80	1202.01	1202.0	1202.14100	1202.87	3.089587	7.26	4.66	125.57	6.65
1	2702.94*	PF 1	33.80	1201.13	1201.2	1201.26400	1201.52	0.628997	4.57	7.39	120.77	3.26
1	2701.94*	PF 1	33.80	1200.24	1200.3	1200.37800	1200.73	0.963430	5.29	6.39	115.78	3.97
1	2700.94*	PF 1	33.80	1199.35	1199.4	1199.49300	1199.82	0.837743	5.16	6.55	110.85	3.74
1	2700.54	PF 1	33.80	1199.00	1199.1	1199.14400	1199.49	0.868102	5.25	6.44	108.90	3.81
1	2699.54*	PF 1	33.80	1198.99	1199.2	1199.13500	1199.24	0.011603	1.43	23.59	110.00	0.55
1	2698.54*	PF 1	33.80	1198.98	1199.2		1199.23	0.012015	1.45	23.36	110.16	0.55

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2697.54*	PF 1	33.80	1198.97	1199.2		1199.21	0.012614	1.47	23.03	110.32	0.57
1	2696.54*	PF 1	33.80	1198.96	1199.2		1199.20	0.013521	1.50	22.57	110.46	0.58
1	2695.54*	PF 1	33.80	1198.95	1199.1		1199.19	0.014969	1.54	21.90	110.58	0.61
1	2694.54*	PF 1	33.80	1198.94	1199.1		1199.17	0.017092	1.61	21.05	110.71	0.65
1	2693.54*	PF 1	33.80	1198.93	1199.1		1199.16	0.010201	1.63	20.69	110.86	0.67
1	2692.54*	PF 1	33.80	1198.92	1199.1		1199.15	0.010190	1.63	20.71	111.04	0.67
1	2691.54*	PF 1	33.80	1198.91	1199.1		1199.14	0.010158	1.63	20.75	111.20	0.67
1	2690.54*	PF 1	33.80	1198.90	1199.1		1199.13	0.010171	1.63	20.75	111.37	0.67
1	2689.54*	PF 1	33.80	1198.89	1199.1		1199.12	0.010184	1.63	20.75	111.54	0.67
1	2688.54*	PF 1	33.80	1198.88	1199.1		1199.11	0.010175	1.63	20.77	111.71	0.67
1	2687.54*	PF 1	33.80	1198.87	1199.1		1199.10	0.010164	1.63	20.79	111.89	0.66
1	2686.54*	PF 1	33.80	1198.86	1199.0		1199.09	0.010157	1.62	20.81	112.05	0.66
1	2685.54*	PF 1	33.80	1198.85	1199.0		1199.08	0.010170	1.62	20.81	112.22	0.66
1	2684.54*	PF 1	33.80	1198.84	1199.0		1199.07	0.010184	1.62	20.82	112.39	0.67
1	2683.54*	PF 1	33.80	1198.83	1199.0		1199.06	0.010175	1.62	20.84	112.56	0.66
1	2682.54*	PF 1	33.80	1198.82	1199.0		1199.05	0.010142	1.62	20.87	112.74	0.66
1	2681.54*	PF 1	33.80	1198.81	1199.0		1199.04	0.010134	1.62	20.89	112.90	0.66
1	2680.54*	PF 1	33.80	1198.80	1199.0		1199.03	0.010103	1.62	20.92	113.08	0.66
1	2679.54*	PF 1	33.80	1198.79	1199.0		1199.02	0.010072	1.61	20.95	113.25	0.66
1	2678.54*	PF 1	33.80	1198.78	1199.0		1199.01	0.010022	1.61	20.99	113.41	0.66
1	2677.54*	PF 1	33.80	1198.77	1199.0		1199.00	0.009968	1.61	21.04	113.59	0.66
1	2676.54*	PF 1	33.80	1198.76	1198.9		1198.99	0.009916	1.60	21.09	113.76	0.66
1	2675.54*	PF 1	33.80	1198.75	1198.9		1198.98	0.009843	1.60	21.15	113.93	0.65
1	2674.54*	PF 1	33.80	1198.74	1198.9		1198.97	0.009750	1.59	21.22	114.10	0.65
1	2673.54*	PF 1	33.80	1198.73	1198.9		1198.96	0.009657	1.59	21.29	114.27	0.65
1	2672.54*	PF 1	33.80	1198.72	1198.9		1198.95	0.009543	1.58	21.38	114.46	0.64
1	2671.54*	PF 1	33.80	1198.71	1198.9		1198.94	0.009392	1.57	21.50	114.63	0.64
1	2670.54*	PF 1	33.80	1198.70	1198.9		1198.93	0.009224	1.56	21.63	114.81	0.63
1	2669.54*	PF 1	33.80	1198.69	1198.9		1198.92	0.009022	1.55	21.79	114.97	0.63
1	2668.54*	PF 1	33.80	1198.68	1198.9		1198.91	0.008824	1.54	21.94	115.15	0.62
1	2667.54*	PF 1	33.80	1198.67	1198.9		1198.90	0.008558	1.53	22.16	115.34	0.61
1	2666.54*	PF 1	33.80	1198.66	1198.9		1198.89	0.008268	1.51	22.41	115.52	0.60
1	2665.54*	PF 1	33.80	1198.65	1198.8		1198.88	0.007941	1.49	22.69	115.70	0.59
1	2664.54*	PF 1	33.80	1198.64	1198.8		1198.87	0.007599	1.47	23.01	115.89	0.58
1	2663.54*	PF 1	33.80	1198.63	1198.8		1198.87	0.007245	1.45	23.36	116.08	0.57
1	2662.54*	PF 1	33.80	1198.62	1198.8		1198.86	0.006858	1.42	23.76	116.27	0.55
1	2661.54*	PF 1	33.80	1198.61	1198.8		1198.85	0.006446	1.40	24.22	116.46	0.54
1	2661.04	PF 1	33.80	1198.60	1198.8	1198.73700	1198.85	0.005685	1.34	25.16	116.59	0.51

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2616.7	PF 1	33.80	1198.16	1198.3	1198.30200	1198.37	0.025031	2.12	15.92	112.86	1.00
1	2540.68	PF 1	33.80	1197.39	1197.7	1197.53500	1197.72	0.001906	0.99	34.08	109.67	0.31
1	2481.7	PF 1	33.80	1196.79	1197.7		1197.71	0.000039	0.29	118.15	133.14	0.05
1	2409.33	PF 1	33.80	1196.06	1197.7		1197.71	0.000005	0.14	233.84	147.00	0.02
1	2320.35	PF 1	37.50	1195.17	1197.7	1195.34500	1197.71	0.000003	0.15	247.43	105.19	0.02
1	2300		Culvert									
1	2119.93	PF 1	37.50	1185.98	1186.2	1186.22300	1186.34	0.016928	2.59	14.48	56.71	0.90
1	2068.55	PF 1	37.50	1185.47	1185.7		1185.79	0.007150	1.74	21.57	80.60	0.59
1	2000.07	PF 1	37.50	1184.78	1185.1		1185.18	0.011419	2.39	15.72	51.84	0.76
1	1943.65	PF 1	37.50	1184.21	1184.5		1184.61	0.008884	2.19	17.10	53.00	0.68
1	1862.48	PF 1	37.50	1183.39	1183.7		1183.82	0.010726	2.44	15.34	46.50	0.75
1	1861.48*	PF 1	37.50	1183.38	1183.7		1183.81	0.010779	2.45	15.33	46.58	0.75
1	1860.48*	PF 1	37.50	1183.37	1183.7		1183.80	0.010859	2.45	15.30	46.65	0.75
1	1859.48*	PF 1	37.50	1183.36	1183.7		1183.79	0.010976	2.46	15.26	46.71	0.76
1	1858.48*	PF 1	37.50	1183.35	1183.7		1183.78	0.011099	2.46	15.22	46.78	0.76
1	1857.48*	PF 1	37.50	1183.34	1183.7		1183.77	0.011252	2.47	15.16	46.85	0.77
1	1856.48*	PF 1	37.50	1183.33	1183.7		1183.76	0.011437	2.48	15.10	46.91	0.77
1	1855.48*	PF 1	37.50	1183.32	1183.6		1183.74	0.011622	2.49	15.03	46.96	0.78
1	1854.48*	PF 1	37.50	1183.30	1183.6		1183.73	0.010508	2.42	15.51	47.10	0.74
1	1853.48*	PF 1	37.50	1183.29	1183.6		1183.72	0.010522	2.42	15.51	47.17	0.74
1	1852.48*	PF 1	37.50	1183.28	1183.6		1183.71	0.010536	2.42	15.52	47.25	0.74
1	1851.48*	PF 1	37.50	1183.27	1183.6		1183.70	0.010585	2.42	15.50	47.31	0.74
1	1850.48*	PF 1	37.50	1183.26	1183.6		1183.69	0.010613	2.42	15.50	47.39	0.75
1	1849.48*	PF 1	37.50	1183.25	1183.6		1183.68	0.010641	2.42	15.50	47.46	0.75
1	1848.48*	PF 1	37.50	1183.24	1183.6		1183.66	0.010695	2.42	15.49	47.54	0.75
1	1847.48*	PF 1	37.50	1183.23	1183.6		1183.65	0.010754	2.42	15.47	47.60	0.75
1	1846.48*	PF 1	37.50	1183.22	1183.6		1183.64	0.010828	2.43	15.45	47.67	0.75
1	1845.48*	PF 1	37.50	1183.21	1183.5		1183.63	0.010911	2.43	15.42	47.74	0.75
1	1844.48*	PF 1	37.50	1183.20	1183.5		1183.62	0.011023	2.44	15.38	47.81	0.76
1	1843.48*	PF 1	37.50	1183.19	1183.5		1183.61	0.011183	2.45	15.32	47.87	0.76
1	1842.48*	PF 1	37.50	1183.18	1183.5		1183.60	0.011403	2.46	15.24	47.93	0.77
1	1841.48*	PF 1	37.50	1183.17	1183.5		1183.59	0.011581	2.47	15.18	48.00	0.77
1	1840.48*	PF 1	37.50	1183.15	1183.5		1183.57	0.010433	2.39	15.68	48.13	0.74
1	1839.48*	PF 1	37.50	1183.14	1183.5		1183.56	0.010453	2.39	15.68	48.20	0.74
1	1838.48*	PF 1	37.50	1183.13	1183.5		1183.55	0.010456	2.39	15.69	48.28	0.74
1	1837.48*	PF 1	37.50	1183.12	1183.5		1183.54	0.010476	2.39	15.69	48.35	0.74
1	1836.48*	PF 1	37.50	1183.11	1183.4		1183.53	0.010492	2.39	15.69	48.42	0.74
1	1835.48*	PF 1	37.50	1183.10	1183.4		1183.52	0.010512	2.39	15.69	48.49	0.74

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1834.48*	PF 1	37.50	1183.09	1183.4		1183.51	0.010515	2.39	15.70	48.57	0.74
1	1833.48*	PF 1	37.50	1183.08	1183.4		1183.50	0.010536	2.39	15.70	48.64	0.74
1	1832.48*	PF 1	37.50	1183.07	1183.4		1183.49	0.010552	2.39	15.70	48.71	0.74
1	1831.48*	PF 1	37.50	1183.06	1183.4		1183.48	0.010613	2.39	15.68	48.78	0.74
1	1830.48*	PF 1	37.50	1183.05	1183.4		1183.47	0.010643	2.39	15.68	48.86	0.74
1	1829.48*	PF 1	37.50	1183.04	1183.4		1183.46	0.010718	2.40	15.65	48.92	0.75
1	1828.48*	PF 1	37.50	1183.03	1183.4		1183.45	0.010789	2.40	15.63	49.00	0.75
1	1827.48*	PF 1	37.50	1183.02	1183.3		1183.43	0.010839	2.40	15.62	49.06	0.75
1	1826.48*	PF 1	37.50	1183.00	1183.3		1183.42	0.009468	2.30	16.29	49.22	0.71
1	1825.48*	PF 1	37.50	1182.99	1183.3		1183.41	0.009356	2.29	16.36	49.30	0.70
1	1824.48*	PF 1	37.50	1182.98	1183.3		1183.40	0.009240	2.28	16.43	49.38	0.70
1	1823.48*	PF 1	37.50	1182.97	1183.3		1183.39	0.009113	2.27	16.51	49.46	0.69
1	1822.48*	PF 1	37.50	1182.96	1183.3		1183.38	0.008975	2.26	16.59	49.54	0.69
1	1821.48*	PF 1	37.50	1182.95	1183.3		1183.37	0.008828	2.25	16.69	49.63	0.68
1	1820.48*	PF 1	37.50	1182.94	1183.3		1183.36	0.008678	2.23	16.79	49.71	0.68
1	1819.48*	PF 1	37.50	1182.93	1183.3		1183.35	0.008541	2.22	16.88	49.79	0.67
1	1818.48*	PF 1	37.50	1182.92	1183.3		1183.34	0.008364	2.21	17.00	49.88	0.67
1	1817.48*	PF 1	37.50	1182.91	1183.3		1183.34	0.008181	2.19	17.12	49.97	0.66
1	1816.48*	PF 1	37.50	1182.90	1183.3		1183.33	0.007994	2.17	17.25	50.07	0.65
1	1815.48*	PF 1	37.50	1182.89	1183.2		1183.31	0.014528	2.19	17.15	50.11	0.66
1	1814.48*	PF 1	37.50	1182.88	1183.2		1183.30	0.015674	2.24	16.76	50.14	0.68
1	1813.48*	PF 1	37.50	1182.87	1183.2		1183.28	0.017515	2.31	16.22	50.15	0.72
1	1812.48*	PF 1	37.50	1182.86	1183.2		1183.27	0.020695	2.43	15.42	50.13	0.77
1	1811.48*	PF 1	37.50	1182.84	1183.1		1183.24	0.022077	2.48	15.13	50.16	0.80
1	1811.06	PF 1	37.50	1182.84	1183.1	1183.10400	1183.23	0.036813	2.90	12.95	49.93	1.00
1	1810.06*	PF 1	37.50	1182.35	1182.5	1182.62000	1183.09	0.436236	6.28	5.97	46.13	3.07
1	1809.06*	PF 1	37.50	1181.87	1182.0	1182.15900	1182.65	0.434504	6.44	5.83	43.17	3.09
1	1808.06*	PF 1	37.50	1181.38	1181.5	1181.68200	1182.21	0.439387	6.64	5.64	40.21	3.13
1	1807.36	PF 1	37.50	1181.04	1181.2	1181.35300	1181.90	0.435568	6.77	5.54	38.13	3.13
1	1806.36*	PF 1	37.50	1181.03	1181.2	1181.34200	1181.58	0.126861	4.64	8.07	38.76	1.79
1	1805.36*	PF 1	37.50	1181.02	1181.4	1181.32900	1181.51	0.014630	2.39	15.67	40.15	0.68
1	1804.36*	PF 1	37.50	1181.01	1181.4		1181.50	0.015286	2.42	15.49	40.35	0.69
1	1803.36*	PF 1	37.50	1181.00	1181.4		1181.48	0.016209	2.46	15.25	40.54	0.71
1	1802.36*	PF 1	37.50	1180.99	1181.4		1181.47	0.017507	2.51	14.93	40.73	0.73
1	1801.36*	PF 1	37.50	1180.98	1181.3		1181.45	0.018872	2.56	14.62	40.92	0.76
1	1800.36*	PF 1	37.50	1180.97	1181.3		1181.44	0.010844	2.58	14.56	41.14	0.76
1	1799.36*	PF 1	37.50	1180.96	1181.3		1181.43	0.010720	2.56	14.65	41.39	0.76
1	1798.36*	PF 1	37.50	1180.95	1181.3		1181.41	0.010591	2.55	14.73	41.63	0.75

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1797.36*	PF 1	37.50	1180.94	1181.3		1181.40	0.010435	2.53	14.83	41.88	0.75
1	1796.36*	PF 1	37.50	1180.93	1181.3		1181.39	0.010288	2.51	14.93	42.12	0.74
1	1795.36*	PF 1	37.50	1180.92	1181.3		1181.38	0.010110	2.49	15.04	42.37	0.74
1	1794.36*	PF 1	37.50	1180.91	1181.3		1181.37	0.009897	2.47	15.18	42.62	0.73
1	1793.36*	PF 1	37.50	1180.90	1181.3		1181.36	0.009705	2.45	15.30	42.87	0.72
1	1792.36*	PF 1	37.50	1180.90	1181.3		1181.35	0.011178	2.55	14.69	43.01	0.77
1	1791.36*	PF 1	37.50	1180.89	1181.2		1181.34	0.011116	2.54	14.74	43.27	0.77
1	1790.36*	PF 1	37.50	1180.88	1181.2		1181.33	0.011053	2.53	14.80	43.50	0.77
1	1789.36*	PF 1	37.50	1180.87	1181.2		1181.32	0.010991	2.52	14.86	43.74	0.76
1	1788.36*	PF 1	37.50	1180.86	1181.2		1181.31	0.010899	2.51	14.93	43.99	0.76
1	1787.36*	PF 1	37.50	1180.85	1181.2		1181.29	0.010827	2.50	14.99	44.22	0.76
1	1786.36*	PF 1	37.50	1180.84	1181.2		1181.28	0.010731	2.49	15.06	44.46	0.75
1	1785.36*	PF 1	37.50	1180.83	1181.2		1181.27	0.010607	2.48	15.15	44.71	0.75
1	1784.36*	PF 1	37.50	1180.82	1181.2		1181.26	0.010476	2.46	15.24	44.96	0.75
1	1783.36*	PF 1	37.50	1180.81	1181.2		1181.25	0.010344	2.45	15.33	45.20	0.74
1	1782.36*	PF 1	37.50	1180.80	1181.1		1181.24	0.010195	2.43	15.43	45.45	0.74
1	1781.36*	PF 1	37.50	1180.79	1181.1		1181.23	0.010020	2.41	15.55	45.70	0.73
1	1780.36*	PF 1	37.50	1180.78	1181.1		1181.22	0.009826	2.39	15.67	45.96	0.72
1	1779.36*	PF 1	37.50	1180.77	1181.1		1181.21	0.009629	2.37	15.80	46.20	0.72
1	1778.36*	PF 1	37.50	1180.76	1181.1		1181.20	0.009427	2.35	15.94	46.45	0.71
1	1777.36*	PF 1	37.50	1180.75	1181.1		1181.19	0.009193	2.33	16.09	46.71	0.70
1	1777.34	PF 1	37.50	1180.75	1181.1		1181.19	0.009225	2.33	16.08	46.70	0.70
1	1709.86	PF 1	37.50	1180.06	1180.4		1180.53	0.010668	2.56	14.67	41.44	0.76
1	1708.86*	PF 1	37.50	1180.05	1180.4		1180.51	0.010675	2.55	14.68	41.54	0.76
1	1707.86*	PF 1	37.50	1180.04	1180.4		1180.50	0.010669	2.55	14.70	41.64	0.76
1	1706.86*	PF 1	37.50	1180.03	1180.4		1180.49	0.010688	2.55	14.71	41.73	0.76
1	1705.86*	PF 1	37.50	1180.02	1180.4		1180.48	0.010712	2.55	14.71	41.82	0.76
1	1704.86*	PF 1	37.50	1180.01	1180.4		1180.47	0.010719	2.55	14.72	41.91	0.76
1	1703.86*	PF 1	37.50	1180.00	1180.4		1180.46	0.010726	2.55	14.73	42.01	0.76
1	1702.86*	PF 1	37.50	1179.99	1180.3		1180.45	0.010746	2.55	14.73	42.11	0.76
1	1701.86*	PF 1	37.50	1179.98	1180.3		1180.44	0.010754	2.54	14.74	42.20	0.76
1	1700.86*	PF 1	37.50	1179.97	1180.3		1180.43	0.010763	2.54	14.75	42.30	0.76
1	1699.86*	PF 1	37.50	1179.96	1180.3		1180.42	0.010801	2.54	14.75	42.39	0.76
1	1698.86*	PF 1	37.50	1179.95	1180.3		1180.41	0.010834	2.54	14.75	42.48	0.76
1	1697.86*	PF 1	37.50	1179.94	1180.3		1180.40	0.010868	2.54	14.75	42.58	0.76
1	1696.86*	PF 1	37.50	1179.93	1180.3		1180.39	0.010940	2.55	14.73	42.67	0.76
1	1695.86*	PF 1	37.50	1179.92	1180.3		1180.37	0.011001	2.55	14.72	42.76	0.77
1	1694.86*	PF 1	37.50	1179.91	1180.3		1180.36	0.011088	2.55	14.70	42.85	0.77

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1693.86*	PF 1	37.50	1179.90	1180.3		1180.35	0.011176	2.56	14.68	42.94	0.77
1	1692.86*	PF 1	37.50	1179.89	1180.2		1180.34	0.011312	2.56	14.63	43.02	0.77
1	1691.86*	PF 1	37.50	1179.88	1180.2		1180.33	0.011470	2.57	14.59	43.11	0.78
1	1690.86*	PF 1	37.50	1179.87	1180.2		1180.32	0.011606	2.58	14.55	43.20	0.78
1	1689.86*	PF 1	37.50	1179.85	1180.2		1180.30	0.010519	2.50	15.00	43.36	0.75
1	1688.86*	PF 1	37.50	1179.84	1180.2		1180.29	0.010523	2.50	15.01	43.44	0.75
1	1687.86*	PF 1	37.50	1179.83	1180.2		1180.28	0.010521	2.50	15.03	43.54	0.75
1	1686.86*	PF 1	37.50	1179.82	1180.2		1180.27	0.010500	2.49	15.05	43.63	0.75
1	1685.86*	PF 1	37.50	1179.81	1180.2		1180.26	0.010498	2.49	15.06	43.73	0.75
1	1684.86*	PF 1	37.50	1179.80	1180.2		1180.25	0.010484	2.49	15.08	43.83	0.75
1	1683.86*	PF 1	37.50	1179.79	1180.1		1180.24	0.010459	2.48	15.11	43.93	0.75
1	1682.86*	PF 1	37.50	1179.78	1180.1		1180.23	0.010434	2.48	15.13	44.02	0.75
1	1681.86*	PF 1	37.50	1179.77	1180.1		1180.22	0.010408	2.47	15.16	44.12	0.74
1	1680.86*	PF 1	37.50	1179.76	1180.1		1180.21	0.010384	2.47	15.18	44.22	0.74
1	1679.86*	PF 1	37.50	1179.75	1180.1		1180.20	0.010364	2.47	15.20	44.31	0.74
1	1678.86*	PF 1	37.50	1179.74	1180.1		1180.19	0.010327	2.46	15.23	44.41	0.74
1	1677.86*	PF 1	37.50	1179.73	1180.1		1180.18	0.010291	2.46	15.26	44.51	0.74
1	1676.86*	PF 1	37.50	1179.72	1180.1		1180.17	0.010243	2.45	15.30	44.61	0.74
1	1675.86*	PF 1	37.50	1179.71	1180.1		1180.15	0.010195	2.45	15.33	44.71	0.74
1	1674.86*	PF 1	37.50	1179.70	1180.1		1180.14	0.010136	2.44	15.37	44.81	0.73
1	1673.86*	PF 1	37.50	1179.69	1180.0		1180.13	0.010082	2.43	15.41	44.90	0.73
1	1672.86*	PF 1	37.50	1179.68	1180.0		1180.12	0.010024	2.43	15.45	45.00	0.73
1	1671.86*	PF 1	37.50	1179.67	1180.0		1180.11	0.009954	2.42	15.50	45.10	0.73
1	1670.86*	PF 1	37.50	1179.66	1180.0		1180.10	0.009862	2.41	15.55	45.20	0.72
1	1669.86*	PF 1	37.50	1179.65	1180.0		1180.09	0.009772	2.40	15.61	45.31	0.72
1	1668.86*	PF 1	37.50	1179.64	1180.0		1180.08	0.009660	2.39	15.68	45.41	0.72
1	1667.86*	PF 1	37.50	1179.63	1180.0		1180.07	0.009538	2.38	15.75	45.52	0.71
1	1666.86*	PF 1	37.50	1179.62	1180.0		1180.06	0.009423	2.37	15.82	45.61	0.71
1	1665.86*	PF 1	37.50	1179.61	1180.0		1180.05	0.009294	2.36	15.90	45.72	0.70
1	1664.86*	PF 1	37.50	1179.60	1180.0		1180.04	0.009157	2.35	15.99	45.82	0.70
1	1663.86*	PF 1	37.50	1179.59	1179.9		1180.03	0.009012	2.33	16.08	45.93	0.69
1	1662.86*	PF 1	37.50	1179.58	1179.9		1180.02	0.008860	2.32	16.18	46.04	0.69
1	1661.86*	PF 1	37.50	1179.57	1179.9		1180.01	0.008691	2.30	16.29	46.15	0.68
1	1660.86*	PF 1	37.50	1179.56	1179.9		1180.00	0.008529	2.29	16.39	46.25	0.68
1	1659.86*	PF 1	37.50	1179.55	1179.9		1180.00	0.008340	2.27	16.52	46.36	0.67
1	1658.86*	PF 1	37.50	1179.54	1179.9		1179.99	0.008147	2.25	16.65	46.47	0.66
1	1657.86*	PF 1	37.50	1179.53	1179.9		1179.98	0.007959	2.23	16.79	46.58	0.66
1	1656.86*	PF 1	37.50	1179.52	1179.9		1179.97	0.014386	2.24	16.72	46.67	0.66

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1655.86*	PF 1	37.50	1179.51	1179.9		1179.95	0.015340	2.29	16.40	46.73	0.68
1	1654.86*	PF 1	37.50	1179.50	1179.8		1179.94	0.016832	2.35	15.96	46.76	0.71
1	1653.86*	PF 1	37.50	1179.49	1179.8		1179.92	0.019629	2.46	15.24	46.76	0.76
1	1652.86*	PF 1	37.50	1179.48	1179.8	1179.75800	1179.90	0.029541	2.79	13.46	46.63	0.91
1	1652.33	PF 1	37.50	1179.47	1179.7	1179.74700	1179.88	0.035952	2.96	12.69	46.57	1.00
1	1651.33*	PF 1	37.50	1178.74	1178.9	1179.03500	1179.71	0.661014	7.40	5.07	41.76	3.74
1	1650.33*	PF 1	37.50	1178.01	1178.1	1178.32000	1179.05	0.649743	7.65	4.90	37.92	3.75
1	1649.71	PF 1	37.50	1177.56	1177.7	1177.88400	1178.65	0.639216	7.81	4.80	35.56	3.75
1	1648.71*	PF 1	37.50	1177.55	1177.7	1177.87500	1178.19	0.183411	5.32	7.05	36.39	2.13
1	1647.71*	PF 1	37.50	1177.54	1177.9	1177.86100	1178.04	0.016350	2.53	14.84	38.09	0.71
1	1646.71*	PF 1	37.50	1177.53	1177.9		1178.03	0.017086	2.55	14.71	38.51	0.73
1	1645.71*	PF 1	37.50	1177.52	1177.9		1178.01	0.018223	2.59	14.48	38.91	0.75
1	1644.71*	PF 1	37.50	1177.51	1177.9		1177.99	0.020045	2.65	14.13	39.30	0.78
1	1643.71*	PF 1	37.50	1177.50	1177.9		1177.97	0.022066	2.72	13.78	39.70	0.81
1	1642.71*	PF 1	37.50	1177.49	1177.8		1177.96	0.012830	2.74	13.71	40.13	0.83
1	1641.71*	PF 1	37.50	1177.48	1177.8		1177.94	0.012788	2.72	13.78	40.59	0.82
1	1640.71*	PF 1	37.50	1177.47	1177.8		1177.93	0.012721	2.70	13.87	41.05	0.82
1	1639.71*	PF 1	37.50	1177.46	1177.8		1177.92	0.012674	2.69	13.94	41.51	0.82
1	1638.71*	PF 1	37.50	1177.45	1177.8		1177.90	0.012617	2.67	14.02	41.96	0.82
1	1637.71*	PF 1	37.50	1177.44	1177.8		1177.89	0.012587	2.66	14.09	42.41	0.81
1	1636.71*	PF 1	37.50	1177.43	1177.8		1177.88	0.012571	2.65	14.16	42.87	0.81
1	1635.71*	PF 1	37.50	1177.42	1177.8		1177.86	0.012529	2.63	14.23	43.33	0.81
1	1634.71*	PF 1	37.50	1177.41	1177.7		1177.85	0.012476	2.62	14.31	43.79	0.81
1	1633.71*	PF 1	37.50	1177.40	1177.7		1177.84	0.012444	2.61	14.38	44.25	0.81
1	1632.71*	PF 1	37.50	1177.39	1177.7		1177.83	0.012400	2.59	14.45	44.70	0.80
1	1631.71*	PF 1	37.50	1177.38	1177.7		1177.81	0.012340	2.58	14.54	45.17	0.80
1	1630.71*	PF 1	37.50	1177.37	1177.7		1177.80	0.012290	2.57	14.61	45.63	0.80
1	1629.71*	PF 1	37.50	1177.36	1177.7		1177.79	0.012250	2.55	14.68	46.08	0.80
1	1628.71*	PF 1	37.50	1177.35	1177.7		1177.77	0.012223	2.54	14.75	46.54	0.80
1	1627.71*	PF 1	37.50	1177.34	1177.7		1177.76	0.012185	2.53	14.82	47.00	0.79
1	1626.71*	PF 1	37.50	1177.33	1177.7		1177.75	0.012135	2.52	14.90	47.46	0.79
1	1625.71*	PF 1	37.50	1177.32	1177.6		1177.74	0.012089	2.50	14.97	47.92	0.79
1	1624.71*	PF 1	37.50	1177.31	1177.6		1177.72	0.012062	2.49	15.04	48.38	0.79
1	1623.71*	PF 1	37.50	1177.30	1177.6		1177.71	0.012023	2.48	15.11	48.84	0.79
1	1622.71*	PF 1	37.50	1177.29	1177.6		1177.70	0.011988	2.47	15.18	49.30	0.78
1	1621.71*	PF 1	37.50	1177.28	1177.6		1177.69	0.011945	2.46	15.26	49.75	0.78
1	1620.71*	PF 1	37.50	1177.27	1177.6		1177.67	0.011896	2.45	15.33	50.22	0.78
1	1619.71*	PF 1	37.50	1177.26	1177.6		1177.66	0.011824	2.43	15.42	50.69	0.78

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1618.71*	PF 1	37.50	1177.25	1177.6		1177.65	0.011755	2.42	15.50	51.15	0.77
1	1617.71*	PF 1	37.50	1177.24	1177.5		1177.64	0.011704	2.41	15.57	51.61	0.77
1	1616.71*	PF 1	37.50	1177.23	1177.5		1177.63	0.011626	2.39	15.66	52.08	0.77
1	1615.71*	PF 1	37.50	1177.22	1177.5		1177.61	0.011551	2.38	15.75	52.54	0.77
1	1614.71*	PF 1	37.50	1177.21	1177.5		1177.60	0.011452	2.37	15.84	52.99	0.76
1	1613.71*	PF 1	37.50	1177.20	1177.5		1177.59	0.011352	2.35	15.94	53.46	0.76
1	1612.71*	PF 1	37.50	1177.19	1177.5		1177.58	0.011239	2.34	16.04	53.93	0.76
1	1611.71*	PF 1	37.50	1177.18	1177.5		1177.57	0.011115	2.32	16.15	54.39	0.75
1	1610.71*	PF 1	37.50	1177.17	1177.5		1177.55	0.010964	2.30	16.27	54.86	0.75
1	1609.71*	PF 1	37.50	1177.16	1177.5		1177.54	0.010788	2.29	16.41	55.33	0.74
1	1608.71*	PF 1	37.50	1177.15	1177.5		1177.53	0.010584	2.26	16.56	55.81	0.73
1	1607.71*	PF 1	37.50	1177.14	1177.4		1177.52	0.010346	2.24	16.73	56.28	0.72
1	1606.71*	PF 1	37.50	1177.13	1177.4		1177.51	0.010079	2.22	16.92	56.75	0.72
1	1605.71*	PF 1	37.50	1177.12	1177.4		1177.50	0.009804	2.19	17.12	57.22	0.71
1	1604.71*	PF 1	37.50	1177.11	1177.4		1177.49	0.009512	2.16	17.33	57.70	0.70
1	1603.71*	PF 1	37.50	1177.10	1177.4		1177.48	0.009194	2.13	17.57	58.18	0.68
1	1602.71*	PF 1	37.50	1177.09	1177.4		1177.47	0.008865	2.10	17.82	58.66	0.67
1	1602.35	PF 1	37.50	1177.09	1177.4		1177.47	0.009257	2.13	17.60	58.81	0.69
1	1601.35*	PF 1	37.50	1177.08	1177.4		1177.46	0.009259	2.13	17.59	58.70	0.69
1	1600.35*	PF 1	37.50	1177.07	1177.4		1177.45	0.009260	2.13	17.58	58.59	0.69
1	1599.35*	PF 1	37.50	1177.06	1177.4		1177.44	0.009262	2.14	17.56	58.48	0.69
1	1598.35*	PF 1	37.50	1177.05	1177.4		1177.43	0.009247	2.14	17.56	58.38	0.69
1	1597.35*	PF 1	37.50	1177.04	1177.3		1177.42	0.009248	2.14	17.55	58.28	0.69
1	1596.35*	PF 1	37.50	1177.03	1177.3		1177.41	0.009253	2.14	17.53	58.15	0.69
1	1595.35*	PF 1	37.50	1177.02	1177.3		1177.40	0.009256	2.14	17.51	58.03	0.69
1	1594.35*	PF 1	37.50	1177.01	1177.3		1177.39	0.009256	2.14	17.50	57.91	0.69
1	1593.35*	PF 1	37.50	1177.00	1177.3		1177.38	0.009258	2.15	17.48	57.78	0.69
1	1592.35*	PF 1	37.50	1176.99	1177.3		1177.37	0.009247	2.15	17.47	57.66	0.69
1	1591.35*	PF 1	37.50	1176.98	1177.3		1177.36	0.009231	2.15	17.47	57.56	0.69
1	1590.35*	PF 1	37.50	1176.97	1177.3		1177.35	0.009222	2.15	17.46	57.44	0.69
1	1589.35*	PF 1	37.50	1176.96	1177.3		1177.34	0.009229	2.15	17.44	57.31	0.69
1	1588.35*	PF 1	37.50	1176.95	1177.3		1177.33	0.009232	2.15	17.42	57.20	0.69
1	1587.35*	PF 1	37.50	1176.94	1177.3		1177.32	0.009221	2.15	17.42	57.08	0.69
1	1586.35*	PF 1	37.50	1176.93	1177.2		1177.31	0.009236	2.16	17.39	56.96	0.69
1	1585.35*	PF 1	37.50	1176.92	1177.2		1177.30	0.009228	2.16	17.38	56.85	0.69
1	1584.35*	PF 1	37.50	1176.91	1177.2		1177.29	0.009217	2.16	17.38	56.73	0.69
1	1583.35*	PF 1	37.50	1176.90	1177.2		1177.28	0.009207	2.16	17.37	56.63	0.69
1	1582.35*	PF 1	37.50	1176.89	1177.2		1177.28	0.009212	2.16	17.35	56.51	0.69

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1581.35*	PF 1	37.50	1176.88	1177.2		1177.27	0.009213	2.16	17.34	56.40	0.69
1	1580.35*	PF 1	37.50	1176.87	1177.2		1177.26	0.009218	2.17	17.32	56.28	0.69
1	1579.35*	PF 1	37.50	1176.86	1177.2		1177.25	0.009222	2.17	17.30	56.16	0.69
1	1578.35*	PF 1	37.50	1176.85	1177.2		1177.24	0.009212	2.17	17.30	56.05	0.69
1	1577.35*	PF 1	37.50	1176.84	1177.2		1177.23	0.009216	2.17	17.28	55.93	0.69
1	1576.35*	PF 1	37.50	1176.83	1177.1		1177.22	0.009208	2.17	17.27	55.83	0.69
1	1575.35*	PF 1	37.50	1176.82	1177.1		1177.21	0.009198	2.17	17.26	55.71	0.69
1	1574.35*	PF 1	37.50	1176.81	1177.1		1177.20	0.009215	2.18	17.24	55.60	0.69
1	1573.35*	PF 1	37.50	1176.80	1177.1		1177.19	0.009221	2.18	17.22	55.47	0.69
1	1572.35*	PF 1	37.50	1176.79	1177.1		1177.18	0.009211	2.18	17.21	55.37	0.69
1	1571.35*	PF 1	37.50	1176.78	1177.1		1177.17	0.009217	2.18	17.19	55.25	0.69
1	1570.35*	PF 1	37.50	1176.77	1177.1		1177.16	0.009211	2.18	17.18	55.13	0.69
1	1569.35*	PF 1	37.50	1176.76	1177.1		1177.15	0.009200	2.18	17.18	55.03	0.69
1	1568.35*	PF 1	37.50	1176.75	1177.1		1177.14	0.009207	2.19	17.16	54.91	0.69
1	1567.35*	PF 1	37.50	1176.74	1177.1		1177.13	0.009201	2.19	17.15	54.79	0.69
1	1566.35*	PF 1	37.50	1176.73	1177.0		1177.12	0.009180	2.19	17.14	54.68	0.69
1	1565.35*	PF 1	37.50	1176.72	1177.0		1177.11	0.009178	2.19	17.13	54.56	0.69
1	1564.35*	PF 1	37.50	1176.71	1177.0		1177.11	0.009173	2.19	17.12	54.44	0.69
1	1563.35*	PF 1	37.50	1176.70	1177.0		1177.10	0.009157	2.19	17.11	54.32	0.69
1	1562.35*	PF 1	37.50	1176.69	1177.0		1177.09	0.009136	2.19	17.11	54.22	0.69
1	1561.35*	PF 1	37.50	1176.68	1177.0		1177.08	0.009132	2.19	17.10	54.11	0.69
1	1560.35*	PF 1	37.50	1176.67	1177.0		1177.07	0.009127	2.19	17.09	53.99	0.69
1	1559.35*	PF 1	37.50	1176.66	1177.0		1177.06	0.009120	2.20	17.08	53.88	0.69
1	1558.35*	PF 1	37.50	1176.65	1177.0		1177.05	0.009104	2.20	17.07	53.76	0.69
1	1557.35*	PF 1	37.50	1176.64	1177.0		1177.04	0.009077	2.20	17.07	53.65	0.69
1	1556.35*	PF 1	37.50	1176.63	1177.0		1177.03	0.009059	2.20	17.07	53.54	0.69
1	1555.35*	PF 1	37.50	1176.62	1176.9		1177.02	0.009032	2.20	17.07	53.43	0.69
1	1554.35*	PF 1	37.50	1176.61	1176.9		1177.01	0.009006	2.20	17.07	53.31	0.68
1	1553.35*	PF 1	37.50	1176.60	1176.9		1177.00	0.008977	2.20	17.07	53.20	0.68
1	1552.35*	PF 1	37.50	1176.59	1176.9		1176.99	0.008963	2.20	17.06	53.09	0.68
1	1551.35*	PF 1	37.50	1176.58	1176.9		1176.98	0.008938	2.20	17.06	52.97	0.68
1	1550.35*	PF 1	37.50	1176.57	1176.9		1176.97	0.008910	2.20	17.07	52.86	0.68
1	1549.35*	PF 1	37.50	1176.56	1176.9		1176.97	0.008897	2.20	17.06	52.75	0.68
1	1548.35*	PF 1	37.50	1176.55	1176.9		1176.96	0.008873	2.20	17.06	52.63	0.68
1	1547.35*	PF 1	37.50	1176.54	1176.9		1176.95	0.008834	2.20	17.07	52.53	0.68
1	1546.35*	PF 1	37.50	1176.53	1176.9		1176.94	0.008800	2.20	17.07	52.42	0.68
1	1545.35*	PF 1	37.50	1176.52	1176.9		1176.93	0.008755	2.20	17.08	52.30	0.68
1	1544.35*	PF 1	37.50	1176.51	1176.8		1176.92	0.008719	2.19	17.09	52.19	0.68

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1543.35*	PF 1	37.50	1176.50	1176.8		1176.91	0.008675	2.19	17.10	52.08	0.67
1	1542.35*	PF 1	37.50	1176.49	1176.8		1176.90	0.008632	2.19	17.11	51.97	0.67
1	1541.35*	PF 1	37.50	1176.48	1176.8		1176.89	0.008579	2.19	17.13	51.85	0.67
1	1540.35*	PF 1	37.50	1176.47	1176.8		1176.88	0.008527	2.19	17.15	51.74	0.67
1	1539.35*	PF 1	37.50	1176.46	1176.8		1176.87	0.008475	2.19	17.16	51.63	0.67
1	1538.35*	PF 1	37.50	1176.45	1176.8		1176.86	0.008414	2.18	17.18	51.52	0.67
1	1537.35*	PF 1	37.50	1176.44	1176.8		1176.86	0.008341	2.18	17.22	51.41	0.66
1	1536.35*	PF 1	37.50	1176.43	1176.8		1176.85	0.008282	2.18	17.24	51.30	0.66
1	1535.35*	PF 1	37.50	1176.42	1176.8		1176.84	0.008205	2.17	17.27	51.19	0.66
1	1534.35*	PF 1	37.50	1176.41	1176.8		1176.83	0.008125	2.17	17.31	51.09	0.66
1	1533.35*	PF 1	37.50	1176.40	1176.7		1176.82	0.008031	2.16	17.35	50.98	0.65
1	1532.35*	PF 1	37.50	1176.39	1176.7		1176.81	0.007939	2.16	17.40	50.87	0.65
1	1531.35*	PF 1	37.50	1176.38	1176.7		1176.80	0.007837	2.15	17.45	50.77	0.65
1	1530.35*	PF 1	37.50	1176.37	1176.7		1176.79	0.007731	2.14	17.51	50.66	0.64
1	1529.35*	PF 1	37.50	1176.36	1176.7		1176.79	0.007609	2.13	17.58	50.55	0.64
1	1528.35*	PF 1	37.50	1176.35	1176.7		1176.78	0.007479	2.12	17.66	50.46	0.63
1	1527.35*	PF 1	37.50	1176.34	1176.7		1176.77	0.013593	2.14	17.52	50.32	0.64
1	1526.35*	PF 1	37.50	1176.33	1176.7		1176.75	0.014611	2.19	17.12	50.17	0.66
1	1525.35*	PF 1	37.50	1176.32	1176.7		1176.74	0.016122	2.26	16.60	50.00	0.69
1	1524.35*	PF 1	37.50	1176.31	1176.6		1176.72	0.019069	2.38	15.76	49.78	0.75
1	1523.35*	PF 1	37.50	1176.30	1176.6	1176.56600	1176.70	0.029753	2.73	13.75	49.42	0.91
1	1522.84	PF 1	37.50	1176.29	1176.6	1176.55600	1176.69	0.036958	2.91	12.87	49.25	1.01
1	1521.84*	PF 1	37.50	1175.54	1175.7	1175.81300	1176.51	0.762265	7.43	5.05	46.03	3.95
1	1520.84*	PF 1	37.50	1174.79	1174.9	1175.07300	1175.77	0.721089	7.45	5.03	43.78	3.88
1	1520.83	PF 1	37.50	1174.79	1174.9	1175.07400	1175.77	0.714191	7.43	5.05	43.77	3.86
1	1519.83*	PF 1	37.50	1174.78	1175.0	1175.06300	1175.32	0.169872	4.80	7.81	44.42	2.02
1	1518.83*	PF 1	37.50	1174.77	1175.1	1175.05200	1175.22	0.014481	2.26	16.56	45.83	0.66
1	1517.83*	PF 1	37.50	1174.76	1175.1		1175.21	0.015168	2.29	16.37	46.07	0.68
1	1516.83*	PF 1	37.50	1174.75	1175.1		1175.19	0.016180	2.33	16.09	46.30	0.70
1	1515.83*	PF 1	37.50	1174.74	1175.1		1175.17	0.017735	2.39	15.68	46.51	0.73
1	1514.83*	PF 1	37.50	1174.73	1175.1		1175.16	0.019505	2.46	15.26	46.71	0.76
1	1513.83*	PF 1	37.50	1174.72	1175.0		1175.15	0.011342	2.48	15.14	46.96	0.77
1	1512.83*	PF 1	37.50	1174.71	1175.0		1175.13	0.011333	2.47	15.18	47.23	0.77
1	1511.83*	PF 1	37.50	1174.70	1175.0		1175.12	0.011336	2.46	15.21	47.50	0.77
1	1510.83*	PF 1	37.50	1174.69	1175.0		1175.11	0.011330	2.46	15.25	47.77	0.77
1	1509.83*	PF 1	37.50	1174.68	1175.0		1175.10	0.011340	2.45	15.28	48.03	0.77
1	1508.83*	PF 1	37.50	1174.67	1175.0		1175.09	0.011347	2.45	15.31	48.30	0.77
1	1507.83*	PF 1	37.50	1174.66	1175.0		1175.08	0.011340	2.44	15.35	48.57	0.77

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1506.83*	PF 1	37.50	1174.65	1175.0		1175.06	0.011344	2.44	15.38	48.83	0.77
1	1505.83*	PF 1	37.50	1174.64	1175.0		1175.05	0.011339	2.43	15.41	49.10	0.77
1	1504.83*	PF 1	37.50	1174.63	1174.9		1175.04	0.011337	2.43	15.45	49.37	0.76
1	1503.83*	PF 1	37.50	1174.62	1174.9		1175.03	0.011339	2.42	15.48	49.64	0.76
1	1502.83*	PF 1	37.50	1174.61	1174.9		1175.02	0.011343	2.42	15.51	49.90	0.76
1	1501.83*	PF 1	37.50	1174.60	1174.9		1175.01	0.011344	2.41	15.55	50.18	0.76
1	1500.83*	PF 1	37.50	1174.59	1174.9		1175.00	0.011350	2.41	15.58	50.44	0.76
1	1499.83*	PF 1	37.50	1174.58	1174.9		1174.98	0.011353	2.40	15.61	50.71	0.76
1	1498.83*	PF 1	37.50	1174.57	1174.9		1174.97	0.011396	2.40	15.62	50.96	0.76
1	1497.83*	PF 1	37.50	1174.56	1174.9		1174.96	0.011447	2.40	15.63	51.24	0.77
1	1496.83*	PF 1	37.50	1174.55	1174.9		1174.95	0.011484	2.40	15.65	51.51	0.77
1	1495.83*	PF 1	37.50	1174.54	1174.8		1174.94	0.011547	2.40	15.66	51.76	0.77
1	1494.83*	PF 1	37.50	1174.53	1174.8		1174.93	0.011602	2.39	15.67	52.03	0.77
1	1493.83*	PF 1	37.50	1174.52	1174.8		1174.91	0.011691	2.39	15.66	52.30	0.77
1	1492.83*	PF 1	37.50	1174.51	1174.8		1174.90	0.011835	2.40	15.64	52.56	0.78
1	1491.83*	PF 1	37.50	1174.50	1174.8		1174.89	0.011999	2.40	15.60	52.81	0.78
1	1490.83*	PF 1	37.50	1174.49	1174.8		1174.88	0.012214	2.41	15.55	53.08	0.79
1	1489.83*	PF 1	37.50	1174.48	1174.8		1174.87	0.012441	2.42	15.49	53.33	0.79
1	1488.83*	PF 1	37.50	1174.46	1174.8		1174.85	0.011070	2.33	16.09	53.67	0.75
1	1487.83*	PF 1	37.50	1174.45	1174.8		1174.84	0.011059	2.33	16.12	53.93	0.75
1	1486.83*	PF 1	37.50	1174.44	1174.7		1174.83	0.011050	2.32	16.16	54.20	0.75
1	1485.83*	PF 1	37.50	1174.43	1174.7		1174.82	0.011066	2.32	16.18	54.47	0.75
1	1484.83*	PF 1	37.50	1174.42	1174.7		1174.80	0.011055	2.31	16.22	54.74	0.75
1	1483.83*	PF 1	37.50	1174.41	1174.7		1174.79	0.011052	2.31	16.25	55.00	0.75
1	1482.83*	PF 1	37.50	1174.40	1174.7		1174.78	0.011041	2.30	16.29	55.27	0.75
1	1481.83*	PF 1	37.50	1174.39	1174.7		1174.77	0.011032	2.30	16.33	55.55	0.75
1	1480.83*	PF 1	37.50	1174.38	1174.7		1174.76	0.011013	2.29	16.37	55.82	0.75
1	1479.83*	PF 1	37.50	1174.37	1174.7		1174.75	0.011009	2.29	16.40	56.08	0.75
1	1478.83*	PF 1	37.50	1174.36	1174.7		1174.74	0.011002	2.28	16.43	56.36	0.75
1	1477.83*	PF 1	37.50	1174.35	1174.6		1174.73	0.011000	2.28	16.46	56.62	0.74
1	1476.83*	PF 1	37.50	1174.34	1174.6		1174.72	0.010995	2.27	16.50	56.90	0.74
1	1475.83*	PF 1	37.50	1174.33	1174.6		1174.70	0.010980	2.27	16.54	57.16	0.74
1	1474.83*	PF 1	37.50	1174.32	1174.6		1174.69	0.010965	2.26	16.57	57.43	0.74
1	1473.83*	PF 1	37.50	1174.31	1174.6		1174.68	0.010978	2.26	16.60	57.70	0.74
1	1472.83*	PF 1	37.50	1174.30	1174.6		1174.67	0.010965	2.25	16.64	57.97	0.74
1	1471.83*	PF 1	37.50	1174.29	1174.6		1174.66	0.010968	2.25	16.66	58.23	0.74
1	1470.83*	PF 1	37.50	1174.28	1174.6		1174.65	0.010952	2.25	16.70	58.51	0.74
1	1469.83*	PF 1	37.50	1174.27	1174.6		1174.64	0.010922	2.24	16.75	58.78	0.74

Plan 03 - Proposed Invert Slope (Normal Depth Downstream Boundary Condition)

HEC-RAS Plan: Plan 03 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1468.83*	PF 1	37.50	1174.26	1174.5		1174.63	0.010916	2.23	16.78	59.04	0.74
1	1467.83*	PF 1	37.50	1174.25	1174.5		1174.62	0.010903	2.23	16.82	59.32	0.74
1	1466.83*	PF 1	37.50	1174.24	1174.5		1174.60	0.010890	2.22	16.85	59.59	0.74
1	1465.83*	PF 1	37.50	1174.23	1174.5		1174.59	0.010882	2.22	16.89	59.86	0.74
1	1464.83*	PF 1	37.50	1174.22	1174.5		1174.58	0.010875	2.22	16.92	60.12	0.74
1	1463.83*	PF 1	37.50	1174.21	1174.5		1174.57	0.010849	2.21	16.96	60.40	0.74
1	1462.83*	PF 1	37.50	1174.20	1174.5		1174.56	0.010843	2.21	17.00	60.66	0.73
1	1461.83*	PF 1	37.50	1174.19	1174.5		1174.55	0.010819	2.20	17.04	60.94	0.73
1	1460.83*	PF 1	37.50	1174.18	1174.5		1174.54	0.010834	2.20	17.06	61.20	0.73
1	1459.83*	PF 1	37.50	1174.17	1174.5		1174.53	0.010826	2.19	17.10	61.47	0.73
1	1458.83*	PF 1	37.50	1174.16	1174.4		1174.52	0.010804	2.19	17.14	61.75	0.73
1	1457.83*	PF 1	37.50	1174.15	1174.4		1174.51	0.010770	2.18	17.18	62.02	0.73
1	1456.83*	PF 1	37.50	1174.14	1174.4		1174.49	0.010753	2.18	17.22	62.28	0.73
1	1455.83*	PF 1	37.50	1174.13	1174.4		1174.48	0.010732	2.17	17.26	62.56	0.73
1	1454.83*	PF 1	37.50	1174.12	1174.4		1174.47	0.010700	2.17	17.31	62.83	0.73
1	1453.83*	PF 1	37.50	1174.11	1174.4		1174.46	0.010665	2.16	17.35	63.10	0.73
1	1452.83*	PF 1	37.50	1174.10	1174.4		1174.45	0.010635	2.16	17.40	63.37	0.73
1	1451.83*	PF 1	37.50	1174.09	1174.4		1174.44	0.010589	2.15	17.45	63.64	0.72
1	1450.83*	PF 1	37.50	1174.08	1174.4		1174.43	0.010525	2.14	17.51	63.92	0.72
1	1449.83*	PF 1	37.50	1174.07	1174.3		1174.42	0.010447	2.13	17.58	64.19	0.72
1	1448.83*	PF 1	37.50	1174.06	1174.3		1174.41	0.010391	2.13	17.64	64.45	0.72
1	1447.98	PF 1	37.50	1174.05	1174.3	1174.27200	1174.40	0.010103	2.11	17.81	64.70	0.71

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3895.84	PF 1	21.70	1230.93	1233.02	1231.55800	1233.03	0.000139	0.73	29.59	20.41	0.11
1	3850.61	PF 1	21.70	1232.17	1232.89		1233.00	0.011530	2.70	8.05	22.07	0.79
1	3806.24	PF 1	21.70	1231.73	1232.45		1232.54	0.008672	2.40	9.03	23.68	0.69
1	3765.08	PF 1	21.70	1231.32	1231.87	1231.87200	1232.02	0.019893	3.08	7.04	23.72	1.00
1	3713.23	PF 1	21.70	1229.97	1230.72	1230.74200	1230.95	0.020959	3.89	5.58	13.88	1.08
1	3712.23*	PF 1	21.70	1229.97	1230.63	1230.69800	1230.93	0.028716	4.41	4.92	12.79	1.25
1	3711.23*	PF 1	21.70	1229.98	1230.65	1230.66200	1230.87	0.018929	3.74	5.80	14.14	1.03
1	3710.23*	PF 1	21.70	1229.98	1230.56	1230.62600	1230.85	0.027251	4.30	5.05	13.16	1.22
1	3709.23*	PF 1	21.70	1229.98	1230.57	1230.59100	1230.80	0.020686	3.84	5.66	14.21	1.07
1	3708.23*	PF 1	21.70	1229.98	1230.50	1230.56200	1230.78	0.026817	4.19	5.18	13.90	1.21
1	3707.23*	PF 1	21.70	1229.99	1230.58	1230.53600	1230.74	0.013990	3.25	6.67	16.02	0.89
1	3706.23*	PF 1	21.70	1229.99	1230.57		1230.72	0.012447	3.08	7.04	16.82	0.84
1	3705.23*	PF 1	21.70	1229.99	1230.57		1230.70	0.010774	2.89	7.50	17.65	0.78
1	3704.23*	PF 1	21.70	1229.99	1230.57		1230.68	0.009571	2.74	7.91	18.46	0.74
1	3703.23*	PF 1	21.70	1230.00	1230.56		1230.67	0.008950	2.65	8.19	19.18	0.71
1	3702.23*	PF 1	21.70	1230.00	1230.56		1230.66	0.008035	2.53	8.58	19.88	0.68
1	3701.23*	PF 1	21.70	1230.00	1230.55		1230.65	0.007371	2.43	8.95	20.68	0.65
1	3700.23*	PF 1	21.70	1230.01	1230.55		1230.64	0.007052	2.36	9.20	21.46	0.64
1	3699.23*	PF 1	21.70	1230.01	1230.55		1230.63	0.006505	2.27	9.56	22.23	0.61
1	3698.23*	PF 1	21.70	1230.01	1230.54		1230.62	0.005940	2.18	9.97	23.06	0.58
1	3697.23*	PF 1	21.70	1230.01	1230.54		1230.61	0.005542	2.10	10.32	23.86	0.56
1	3696.23*	PF 1	21.70	1230.02	1230.54		1230.60	0.005447	2.06	10.51	24.67	0.56
1	3695.23*	PF 1	21.70	1230.02	1230.54		1230.60	0.005109	2.00	10.85	25.49	0.54
1	3694.23*	PF 1	21.70	1230.02	1230.53		1230.59	0.004754	1.93	11.23	26.32	0.52
1	3693.23*	PF 1	21.70	1230.02	1230.53		1230.58	0.004474	1.87	11.59	27.18	0.51
1	3692.23*	PF 1	21.70	1230.03	1230.53		1230.58	0.004499	1.85	11.70	27.97	0.51
1	3691.23*	PF 1	21.70	1230.03	1230.52		1230.57	0.004273	1.81	12.02	28.78	0.49
1	3690.23*	PF 1	21.70	1230.03	1230.52		1230.57	0.004035	1.75	12.37	29.66	0.48
1	3689.23*	PF 1	21.70	1230.04	1230.52		1230.56	0.004099	1.74	12.44	30.44	0.48
1	3688.23*	PF 1	21.70	1230.04	1230.51		1230.56	0.003921	1.70	12.74	31.24	0.47
1	3687.23*	PF 1	21.70	1230.04	1230.51		1230.56	0.003744	1.66	13.07	32.14	0.46
1	3686.23*	PF 1	21.70	1230.04	1230.51		1230.55	0.003575	1.62	13.38	32.94	0.45
1	3685.23*	PF 1	21.70	1230.05	1230.51		1230.55	0.003658	1.62	13.41	33.70	0.45
1	3684.23*	PF 1	21.70	1230.05	1230.50		1230.54	0.003504	1.58	13.71	34.49	0.44
1	3683.23*	PF 1	21.70	1230.05	1230.50		1230.54	0.003399	1.55	13.98	35.41	0.44
1	3682.23*	PF 1	21.70	1230.05	1230.50		1230.54	0.003259	1.52	14.27	36.08	0.43
1	3681.23*	PF 1	21.70	1230.06	1230.50		1230.53	0.003366	1.52	14.23	36.76	0.43
1	3680.22*	PF 1	21.70	1230.06	1230.49		1230.53	0.003240	1.50	14.51	37.49	0.42

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3679.22*	PF 1	21.70	1230.06	1230.49		1230.52	0.003115	1.47	14.79	38.20	0.42
1	3678.22*	PF 1	21.70	1230.06	1230.49		1230.52	0.003017	1.44	15.05	38.90	0.41
1	3677.22*	PF 1	21.70	1230.07	1230.49		1230.52	0.003165	1.45	14.93	39.54	0.42
1	3676.22*	PF 1	21.70	1230.07	1230.48		1230.51	0.003060	1.43	15.19	40.28	0.41
1	3675.22*	PF 1	21.70	1230.07	1230.48		1230.51	0.002980	1.41	15.42	40.99	0.40
1	3674.22*	PF 1	21.70	1230.08	1230.48		1230.51	0.003166	1.42	15.24	41.64	0.42
1	3673.22*	PF 1	21.70	1230.08	1230.47		1230.50	0.003087	1.40	15.46	42.34	0.41
1	3672.22*	PF 1	21.70	1230.08	1230.47		1230.50	0.003015	1.38	15.67	43.08	0.40
1	3671.22*	PF 1	21.70	1230.08	1230.47		1230.50	0.002965	1.37	15.87	43.89	0.40
1	3670.22*	PF 1	21.70	1230.09	1230.46		1230.49	0.003196	1.39	15.62	44.59	0.41
1	3669.22*	PF 1	21.70	1230.09	1230.46		1230.49	0.003153	1.37	15.80	45.44	0.41
1	3668.22*	PF 1	21.70	1230.09	1230.46		1230.49	0.003100	1.36	15.99	46.20	0.41
1	3667.22*	PF 1	21.70	1230.09	1230.46		1230.48	0.003070	1.34	16.15	47.05	0.40
1	3666.22*	PF 1	21.70	1230.10	1230.45		1230.48	0.003354	1.37	15.83	47.83	0.42
1	3665.22*	PF 1	21.70	1230.10	1230.45		1230.48	0.003330	1.36	15.97	48.63	0.42
1	3664.22*	PF 1	21.70	1230.10	1230.45		1230.47	0.003283	1.35	16.10	49.11	0.41
1	3663.22*	PF 1	21.70	1230.11	1230.44		1230.47	0.003643	1.38	15.67	49.59	0.43
1	3662.22*	PF 1	21.70	1230.11	1230.44		1230.47	0.003617	1.38	15.76	50.09	0.43
1	3661.22*	PF 1	21.70	1230.11	1230.43		1230.46	0.003610	1.37	15.84	50.59	0.43
1	3660.22*	PF 1	21.70	1230.11	1230.43		1230.46	0.003624	1.37	15.88	51.09	0.43
1	3659.22*	PF 1	21.70	1230.12	1230.42		1230.45	0.007520	1.43	15.22	51.56	0.46
1	3658.22*	PF 1	21.70	1230.12	1230.41		1230.45	0.008067	1.45	14.95	52.04	0.48
1	3657.22*	PF 1	21.70	1230.12	1230.40		1230.44	0.008810	1.48	14.61	52.49	0.50
1	3656.22*	PF 1	21.70	1230.12	1230.39		1230.43	0.009900	1.53	14.16	52.95	0.52
1	3655.22*	PF 1	21.70	1230.13	1230.37		1230.42	0.014797	1.72	12.59	53.35	0.63
1	3654.26	PF 1	21.70	1230.13	1230.30	1230.30400	1230.39	0.042236	2.36	9.20	53.50	1.00
1	3653.26*	PF 1	21.70	1229.47	1229.54	1229.65400	1230.21	1.136483	6.58	3.30	48.58	4.46
1	3652.26*	PF 1	21.70	1228.80	1228.89	1228.99600	1229.37	0.572175	5.56	3.91	44.39	3.30
1	3651.26*	PF 1	21.70	1228.14	1228.23	1228.35000	1228.77	0.606282	5.89	3.69	40.11	3.42
1	3650.27*	PF 1	21.70	1227.47	1227.57	1227.69600	1228.16	0.604119	6.15	3.53	35.84	3.46
1	3649.27*	PF 1	21.70	1226.81	1226.92	1227.05700	1227.56	0.583646	6.40	3.39	31.59	3.45
1	3648.64	PF 1	21.70	1226.39	1226.51	1226.65200	1227.18	0.576943	6.61	3.28	28.93	3.46
1	3647.64*	PF 1	21.70	1226.38	1226.55	1226.63400	1226.82	0.133642	4.17	5.21	30.55	1.78
1	3646.64*	PF 1	21.70	1226.37	1226.66	1226.61700	1226.75	0.021358	2.34	9.26	32.53	0.77
1	3645.64*	PF 1	21.70	1226.36	1226.64		1226.73	0.022903	2.36	9.20	33.72	0.80
1	3644.64*	PF 1	21.70	1226.34	1226.62		1226.70	0.020637	2.25	9.63	34.99	0.76
1	3643.64*	PF 1	21.70	1226.33	1226.60		1226.68	0.023151	2.30	9.43	36.17	0.80
1	3642.64*	PF 1	21.70	1226.32	1226.57		1226.66	0.027300	2.39	9.08	37.33	0.85

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3641.64*	PF 1	21.70	1226.31	1226.55	1226.52700	1226.64	0.016737	2.42	8.96	38.52	0.88
1	3640.64*	PF 1	21.70	1226.30	1226.53		1226.62	0.017231	2.41	9.00	39.75	0.89
1	3639.64*	PF 1	21.70	1226.29	1226.51	1226.49900	1226.60	0.018043	2.42	8.98	40.96	0.91
1	3638.64*	PF 1	21.70	1226.27	1226.50		1226.58	0.015049	2.26	9.60	42.28	0.84
1	3637.64*	PF 1	21.70	1226.26	1226.49		1226.56	0.015018	2.23	9.72	43.52	0.83
1	3636.64*	PF 1	21.70	1226.25	1226.47		1226.55	0.015091	2.21	9.82	44.76	0.83
1	3635.64*	PF 1	21.70	1226.24	1226.46		1226.53	0.015345	2.20	9.87	46.00	0.84
1	3634.64*	PF 1	21.70	1226.23	1226.44		1226.52	0.015927	2.20	9.87	47.23	0.85
1	3633.64*	PF 1	21.70	1226.22	1226.43		1226.50	0.016706	2.21	9.83	48.45	0.86
1	3632.64*	PF 1	21.70	1226.20	1226.41		1226.48	0.013909	2.07	10.50	49.77	0.79
1	3631.64*	PF 1	21.70	1226.19	1226.40		1226.47	0.013893	2.05	10.60	51.01	0.79
1	3630.64*	PF 1	21.70	1226.18	1226.39		1226.45	0.013955	2.03	10.69	52.26	0.79
1	3629.64*	PF 1	21.70	1226.17	1226.37		1226.44	0.014075	2.02	10.76	53.51	0.79
1	3628.64*	PF 1	21.70	1226.16	1226.36		1226.42	0.014379	2.01	10.79	54.75	0.80
1	3627.64*	PF 1	21.70	1226.15	1226.34		1226.41	0.015033	2.02	10.75	55.98	0.81
1	3626.64*	PF 1	21.70	1226.14	1226.33		1226.39	0.015951	2.04	10.65	57.21	0.83
1	3625.64*	PF 1	21.70	1226.12	1226.32		1226.37	0.013205	1.91	11.37	58.53	0.76
1	3624.64*	PF 1	21.70	1226.11	1226.30		1226.36	0.013263	1.89	11.45	59.78	0.76
1	3623.64*	PF 1	21.70	1226.10	1226.29		1226.35	0.013434	1.89	11.50	61.02	0.77
1	3622.64*	PF 1	21.70	1226.09	1226.28		1226.33	0.013747	1.88	11.52	62.27	0.77
1	3621.64*	PF 1	21.70	1226.08	1226.26		1226.32	0.014457	1.90	11.43	63.49	0.79
1	3620.64*	PF 1	21.70	1226.07	1226.25		1226.30	0.015350	1.92	11.32	64.73	0.81
1	3619.64*	PF 1	21.70	1226.05	1226.24		1226.29	0.012628	1.79	12.10	66.05	0.74
1	3618.64*	PF 1	21.70	1226.04	1226.22		1226.27	0.012677	1.78	12.17	67.29	0.74
1	3617.64*	PF 1	21.70	1226.03	1226.21		1226.26	0.012796	1.77	12.23	68.55	0.74
1	3616.64*	PF 1	21.70	1226.02	1226.20		1226.25	0.012963	1.77	12.27	69.80	0.74
1	3615.64*	PF 1	21.70	1226.01	1226.18		1226.23	0.013310	1.77	12.26	71.04	0.75
1	3614.64*	PF 1	21.70	1226.00	1226.17		1226.22	0.014054	1.79	12.14	72.29	0.77
1	3613.64*	PF 1	21.70	1225.99	1226.15		1226.21	0.015076	1.81	11.97	73.51	0.79
1	3612.64*	PF 1	21.70	1225.97	1226.14		1226.19	0.012262	1.69	12.83	74.84	0.72
1	3611.63*	PF 1	21.70	1225.96	1226.13		1226.18	0.012310	1.68	12.90	76.09	0.72
1	3610.63*	PF 1	21.70	1225.95	1226.12		1226.16	0.012404	1.68	12.95	77.34	0.72
1	3609.63*	PF 1	21.70	1225.94	1226.11		1226.15	0.012601	1.67	12.98	78.60	0.73
1	3608.63*	PF 1	21.70	1225.93	1226.09		1226.14	0.013111	1.68	12.90	79.84	0.74
1	3607.63*	PF 1	21.70	1225.92	1226.08		1226.12	0.013633	1.69	12.83	81.09	0.75
1	3606.63*	PF 1	21.70	1225.90	1226.07		1226.11	0.010805	1.57	13.85	82.41	0.67
1	3605.63*	PF 1	21.70	1225.89	1226.06		1226.10	0.010504	1.54	14.05	83.67	0.66
1	3605.41	PF 1	21.70	1225.89	1226.06		1226.09	0.011142	1.57	13.82	83.93	0.68

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3604.41*	PF 1	21.70	1225.88	1226.05		1226.08	0.010850	1.55	14.03	85.35	0.67
1	3603.41*	PF 1	21.70	1225.86	1226.03		1226.07	0.011324	1.56	13.94	86.78	0.68
1	3602.41*	PF 1	21.70	1225.85	1226.02		1226.06	0.011070	1.54	14.12	88.20	0.68
1	3601.41*	PF 1	21.70	1225.84	1226.01		1226.05	0.010826	1.52	14.31	89.62	0.67
1	3600.41*	PF 1	21.70	1225.82	1226.00		1226.03	0.011283	1.53	14.22	91.05	0.68
1	3599.41*	PF 1	21.70	1225.81	1225.99		1226.02	0.011080	1.51	14.39	92.47	0.67
1	3598.41*	PF 1	21.70	1225.80	1225.98		1226.01	0.010828	1.49	14.58	93.88	0.67
1	3597.41*	PF 1	21.70	1225.79	1225.97		1226.00	0.010588	1.47	14.77	95.30	0.66
1	3596.41*	PF 1	21.70	1225.77	1225.95		1225.99	0.011052	1.48	14.66	96.73	0.67
1	3595.41*	PF 1	21.70	1225.76	1225.94		1225.98	0.010818	1.46	14.84	98.15	0.66
1	3594.41*	PF 1	21.70	1225.75	1225.93		1225.96	0.010538	1.44	15.05	99.57	0.65
1	3593.41*	PF 1	21.70	1225.73	1225.92		1225.95	0.010971	1.45	14.95	101.01	0.67
1	3592.41*	PF 1	21.70	1225.72	1225.91		1225.94	0.010755	1.43	15.13	102.43	0.66
1	3591.41*	PF 1	21.70	1225.71	1225.90		1225.93	0.010519	1.42	15.31	103.85	0.65
1	3590.41*	PF 1	21.70	1225.69	1225.88		1225.92	0.011018	1.43	15.18	105.27	0.66
1	3589.41*	PF 1	21.70	1225.68	1225.87		1225.91	0.010816	1.41	15.35	106.69	0.66
1	3588.41*	PF 1	21.70	1225.67	1225.86		1225.89	0.010591	1.40	15.53	108.11	0.65
1	3587.41*	PF 1	21.70	1225.66	1225.85		1225.88	0.010288	1.38	15.75	109.53	0.64
1	3586.41*	PF 1	21.70	1225.64	1225.84		1225.87	0.010719	1.39	15.63	110.96	0.65
1	3585.41*	PF 1	21.70	1225.63	1225.83		1225.86	0.010475	1.37	15.82	112.39	0.64
1	3584.41*	PF 1	21.70	1225.62	1225.82		1225.85	0.010243	1.36	16.01	113.81	0.64
1	3583.41*	PF 1	21.70	1225.60	1225.81		1225.84	0.010698	1.37	15.88	115.24	0.65
1	3582.41*	PF 1	21.70	1225.59	1225.80		1225.83	0.010500	1.35	16.05	116.66	0.64
1	3581.41*	PF 1	21.70	1225.58	1225.79		1225.82	0.010247	1.34	16.25	118.08	0.63
1	3580.41*	PF 1	21.70	1225.56	1225.77		1225.80	0.010730	1.35	16.10	119.51	0.65
1	3579.41*	PF 1	21.70	1225.55	1225.76		1225.79	0.010606	1.34	16.23	120.93	0.64
1	3578.41*	PF 1	21.70	1225.54	1225.75		1225.78	0.010391	1.32	16.41	122.35	0.64
1	3577.41*	PF 1	21.70	1225.53	1225.74		1225.77	0.010120	1.31	16.62	123.78	0.63
1	3576.41*	PF 1	21.70	1225.51	1225.73		1225.76	0.010559	1.32	16.48	125.22	0.64
1	3575.41*	PF 1	21.70	1225.50	1225.72		1225.75	0.010355	1.30	16.65	126.64	0.63
1	3574.41*	PF 1	21.70	1225.49	1225.71		1225.74	0.010095	1.29	16.86	128.06	0.63
1	3573.41*	PF 1	21.70	1225.47	1225.70		1225.72	0.010524	1.30	16.72	129.50	0.64
1	3572.41*	PF 1	21.70	1225.46	1225.69		1225.71	0.010360	1.29	16.87	130.92	0.63
1	3571.41*	PF 1	21.70	1225.45	1225.68		1225.70	0.010137	1.27	17.06	132.34	0.62
1	3570.41*	PF 1	21.70	1225.43	1225.67		1225.69	0.010659	1.29	16.88	133.77	0.64
1	3569.41*	PF 1	21.70	1225.42	1225.66		1225.68	0.010467	1.27	17.04	135.20	0.63
1	3568.41*	PF 1	21.70	1225.41	1225.65		1225.67	0.010250	1.26	17.22	136.62	0.63
1	3567.41*	PF 1	21.70	1225.40	1225.64		1225.66	0.010007	1.25	17.42	138.04	0.62

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3566.41*	PF 1	21.70	1225.38	1225.62		1225.65	0.010479	1.26	17.25	139.47	0.63
1	3565.41*	PF 1	21.70	1225.37	1225.61		1225.64	0.010268	1.25	17.42	140.89	0.62
1	3564.41*	PF 1	21.70	1225.36	1225.60		1225.63	0.010031	1.23	17.62	142.31	0.62
1	3563.41*	PF 1	21.70	1225.34	1225.59		1225.61	0.010488	1.24	17.45	143.75	0.63
1	3562.41*	PF 1	21.70	1225.33	1225.58		1225.60	0.010318	1.23	17.61	145.17	0.62
1	3561.41*	PF 1	21.70	1225.32	1225.57		1225.59	0.010116	1.22	17.78	146.60	0.62
1	3560.41*	PF 1	21.70	1225.30	1225.56		1225.58	0.010671	1.24	17.57	148.03	0.63
1	3559.41*	PF 1	21.70	1225.29	1225.55		1225.57	0.010687	1.23	17.63	149.45	0.63
1	3558.41*	PF 1	21.70	1225.28	1225.54		1225.56	0.010669	1.23	17.70	150.86	0.63
1	3557.41*	PF 1	21.70	1225.26	1225.52		1225.55	0.011695	1.26	17.29	152.29	0.66
1	3556.41*	PF 1	21.70	1225.25	1225.51		1225.53	0.012663	1.28	16.94	153.69	0.68
1	3555.41*	PF 1	21.70	1225.24	1225.49		1225.52	0.014234	1.32	16.42	155.08	0.72
1	3554.41*	PF 1	21.70	1225.23	1225.49		1225.51	0.009873	1.18	18.39	156.55	0.61
1	3553.41*	PF 1	21.70	1225.21	1225.47		1225.50	0.010267	1.19	18.24	157.99	0.62
1	3552.41*	PF 1	21.70	1225.20	1225.46		1225.49	0.010050	1.18	18.42	159.41	0.61
1	3551.41*	PF 1	21.70	1225.19	1225.45		1225.48	0.009735	1.16	18.67	160.84	0.60
1	3550.41*	PF 1	21.70	1225.17	1225.44		1225.46	0.010068	1.17	18.55	162.27	0.61
1	3549.41*	PF 1	21.70	1225.16	1225.43		1225.45	0.009789	1.16	18.77	163.69	0.60
1	3548.41*	PF 1	21.70	1225.15	1225.42		1225.44	0.009485	1.14	19.01	165.12	0.59
1	3547.42*	PF 1	21.70	1225.13	1225.41		1225.43	0.009712	1.15	18.94	166.55	0.60
1	3546.42*	PF 1	21.70	1225.12	1225.40		1225.42	0.009314	1.13	19.25	167.98	0.59
1	3545.42*	PF 1	21.70	1225.11	1225.39		1225.41	0.008808	1.10	19.64	169.42	0.57
1	3544.42*	PF 1	21.70	1225.10	1225.39		1225.40	0.008199	1.08	20.14	170.96	0.55
1	3543.42*	PF 1	21.70	1225.08	1225.38		1225.40	0.007546	1.05	20.73	172.55	0.53
1	3542.42*	PF 1	21.70	1225.07	1225.37		1225.39	0.006780	1.01	21.49	174.13	0.51
1	3541.42*	PF 1	21.70	1225.06	1225.36		1225.38	0.011390	0.99	21.93	175.67	0.49
1	3540.42*	PF 1	21.70	1225.04	1225.35		1225.37	0.011966	1.00	21.69	177.20	0.50
1	3539.42*	PF 1	21.70	1225.03	1225.34		1225.35	0.012770	1.02	21.34	178.73	0.52
1	3538.42*	PF 1	21.70	1225.02	1225.32		1225.34	0.014422	1.05	20.63	179.96	0.55
1	3537.42*	PF 1	21.70	1225.00	1225.30		1225.32	0.020187	1.16	18.68	180.90	0.64
1	3537.09	PF 1	21.70	1225.00	1225.28	1225.27600	1225.31	0.049493	1.52	14.28	181.11	0.95
1	3536.09*	PF 1	21.70	1224.19	1224.37	1224.42400	1225.08	6.912236	6.76	3.21	176.26	8.83
1	3535.09*	PF 1	21.70	1223.38	1223.55	1223.58800	1223.70	0.480983	3.07	7.07	171.93	2.67
1	3534.09*	PF 1	21.70	1222.56	1222.69	1222.74300	1222.96	1.250571	4.13	5.25	167.40	4.11
1	3533.09*	PF 1	21.70	1221.75	1221.86	1221.90600	1222.04	0.668361	3.46	6.27	162.98	3.11
1	3532.09*	PF 1	21.70	1220.94	1221.01	1221.04700	1221.24	0.971408	3.92	5.54	158.46	3.69
1	3531.18	PF 1	21.70	1220.20	1220.24	1220.28500	1220.45	0.771985	3.69	5.88	154.41	3.34
1	3530.18*	PF 1	21.70	1220.19	1220.23	1220.27600	1220.47	0.942092	3.92	5.53	154.32	3.65

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3529.18*	PF 1	21.70	1220.18	1220.23	1220.26600	1220.37	0.397513	3.03	7.17	154.28	2.48
1	3528.18*	PF 1	21.70	1220.17	1220.31	1220.25200	1220.32	0.011427	1.04	20.82	154.73	0.50
1	3527.18*	PF 1	21.70	1220.16	1220.29		1220.31	0.012195	1.06	20.41	154.63	0.52
1	3526.18*	PF 1	21.70	1220.15	1220.28		1220.30	0.013622	1.10	19.74	154.52	0.54
1	3525.18*	PF 1	21.70	1220.14	1220.26		1220.28	0.016266	1.16	18.71	154.39	0.59
1	3524.18*	PF 1	21.70	1220.13	1220.25		1220.27	0.009970	1.19	18.23	154.29	0.61
1	3523.18*	PF 1	21.70	1220.12	1220.24		1220.26	0.009948	1.19	18.24	154.20	0.61
1	3522.18*	PF 1	21.70	1220.11	1220.23		1220.25	0.009959	1.19	18.22	154.11	0.61
1	3521.18*	PF 1	21.70	1220.10	1220.22		1220.24	0.009935	1.19	18.23	154.03	0.61
1	3520.18*	PF 1	21.70	1220.09	1220.21		1220.23	0.009947	1.19	18.22	153.94	0.61
1	3519.18*	PF 1	21.70	1220.08	1220.20		1220.22	0.009923	1.19	18.23	153.86	0.61
1	3518.18*	PF 1	21.70	1220.07	1220.19		1220.21	0.009901	1.19	18.24	153.77	0.61
1	3517.18*	PF 1	21.70	1220.06	1220.18		1220.20	0.009947	1.19	18.21	153.68	0.61
1	3516.18*	PF 1	21.70	1220.05	1220.17		1220.19	0.009957	1.19	18.20	153.60	0.61
1	3515.18*	PF 1	21.70	1220.04	1220.16		1220.18	0.009969	1.19	18.19	153.51	0.61
1	3514.18*	PF 1	21.70	1220.03	1220.15		1220.17	0.009947	1.19	18.20	153.42	0.61
1	3513.18*	PF 1	21.70	1220.02	1220.14		1220.16	0.009957	1.19	18.19	153.34	0.61
1	3512.18*	PF 1	21.70	1220.01	1220.13		1220.15	0.009969	1.19	18.18	153.25	0.61
1	3511.18*	PF 1	21.70	1220.00	1220.12		1220.14	0.009945	1.19	18.19	153.18	0.61
1	3510.18*	PF 1	21.70	1219.99	1220.11		1220.13	0.009957	1.19	18.18	153.08	0.61
1	3509.18*	PF 1	21.70	1219.98	1220.10		1220.12	0.009933	1.19	18.19	153.01	0.61
1	3508.18*	PF 1	21.70	1219.97	1220.09		1220.11	0.009911	1.19	18.19	152.92	0.61
1	3507.18*	PF 1	21.70	1219.96	1220.08		1220.10	0.009957	1.19	18.17	152.82	0.61
1	3506.18*	PF 1	21.70	1219.95	1220.07		1220.09	0.009933	1.19	18.17	152.75	0.61
1	3505.18*	PF 1	21.70	1219.94	1220.06		1220.08	0.009911	1.19	18.18	152.66	0.61
1	3504.18*	PF 1	21.70	1219.93	1220.05		1220.07	0.009957	1.20	18.15	152.57	0.61
1	3503.18*	PF 1	21.70	1219.92	1220.04		1220.06	0.009967	1.20	18.14	152.49	0.61
1	3502.18*	PF 1	21.70	1219.91	1220.03		1220.05	0.009944	1.20	18.15	152.41	0.61
1	3501.18*	PF 1	21.70	1219.90	1220.02		1220.04	0.009957	1.20	18.14	152.31	0.61
1	3500.18*	PF 1	21.70	1219.89	1220.01		1220.03	0.009967	1.20	18.13	152.23	0.61
1	3499.18*	PF 1	21.70	1219.88	1220.00		1220.02	0.009944	1.20	18.14	152.15	0.61
1	3498.18*	PF 1	21.70	1219.87	1219.99		1220.01	0.009957	1.20	18.13	152.05	0.61
1	3497.18*	PF 1	21.70	1219.86	1219.98		1220.00	0.009934	1.20	18.14	151.97	0.61
1	3496.18*	PF 1	21.70	1219.85	1219.97		1219.99	0.009911	1.20	18.15	151.89	0.61
1	3495.18*	PF 1	21.70	1219.84	1219.96		1219.98	0.009956	1.20	18.12	151.80	0.61
1	3494.18*	PF 1	21.70	1219.83	1219.95		1219.97	0.009934	1.20	18.12	151.71	0.61
1	3493.18*	PF 1	21.70	1219.82	1219.94		1219.96	0.009911	1.20	18.13	151.63	0.61
1	3492.18*	PF 1	21.70	1219.81	1219.93		1219.95	0.009957	1.20	18.10	151.54	0.61

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3491.18*	PF 1	21.70	1219.80	1219.92		1219.94	0.009969	1.20	18.09	151.45	0.61
1	3490.18*	PF 1	21.70	1219.79	1219.91		1219.93	0.009945	1.20	18.10	151.37	0.61
1	3489.18*	PF 1	21.70	1219.78	1219.90		1219.92	0.009957	1.20	18.09	151.28	0.61
1	3488.18*	PF 1	21.70	1219.77	1219.89		1219.91	0.009968	1.20	18.08	151.20	0.61
1	3487.18*	PF 1	21.70	1219.76	1219.88		1219.90	0.009946	1.20	18.09	151.11	0.61
1	3486.18*	PF 1	21.70	1219.75	1219.87		1219.89	0.009924	1.20	18.10	151.02	0.61
1	3485.18*	PF 1	21.70	1219.74	1219.86		1219.88	0.009968	1.20	18.07	150.94	0.61
1	3484.18*	PF 1	21.70	1219.73	1219.85		1219.87	0.009947	1.20	18.08	150.85	0.61
1	3483.18*	PF 1	21.70	1219.72	1219.84		1219.86	0.009925	1.20	18.08	150.76	0.61
1	3482.18*	PF 1	21.70	1219.71	1219.83		1219.85	0.009935	1.20	18.07	150.68	0.61
1	3481.18*	PF 1	21.70	1219.70	1219.82		1219.84	0.009914	1.20	18.08	150.59	0.61
1	3480.18*	PF 1	21.70	1219.69	1219.81		1219.83	0.009926	1.20	18.07	150.50	0.61
1	3479.18*	PF 1	21.70	1219.68	1219.80		1219.82	0.009970	1.20	18.04	150.42	0.61
1	3478.18*	PF 1	21.70	1219.67	1219.79		1219.81	0.009947	1.20	18.05	150.34	0.61
1	3477.18*	PF 1	21.70	1219.66	1219.78		1219.80	0.009959	1.20	18.04	150.25	0.61
1	3476.18*	PF 1	21.70	1219.65	1219.77		1219.79	0.009971	1.20	18.03	150.16	0.61
1	3475.18*	PF 1	21.70	1219.64	1219.76		1219.78	0.009948	1.20	18.04	150.08	0.61
1	3474.18*	PF 1	21.70	1219.63	1219.75		1219.77	0.009926	1.20	18.05	149.99	0.61
1	3473.18*	PF 1	21.70	1219.62	1219.74		1219.76	0.009972	1.20	18.02	149.90	0.61
1	3472.18*	PF 1	21.70	1219.61	1219.73		1219.75	0.009949	1.20	18.03	149.82	0.61
1	3471.18*	PF 1	21.70	1219.60	1219.72		1219.74	0.009926	1.20	18.03	149.74	0.61
1	3470.18*	PF 1	21.70	1219.59	1219.71		1219.73	0.009939	1.20	18.02	149.64	0.61
1	3469.18*	PF 1	21.70	1219.58	1219.70		1219.72	0.009916	1.20	18.03	149.57	0.61
1	3468.18*	PF 1	21.70	1219.57	1219.69		1219.71	0.009894	1.20	18.04	149.49	0.61
1	3467.18*	PF 1	21.70	1219.56	1219.68		1219.70	0.009907	1.20	18.03	149.39	0.61
1	3466.18*	PF 1	21.70	1219.55	1219.67		1219.69	0.009918	1.20	18.02	149.31	0.61
1	3465.18*	PF 1	21.70	1219.54	1219.66		1219.68	0.009895	1.20	18.03	149.23	0.61
1	3464.18*	PF 1	21.70	1219.53	1219.65		1219.67	0.009874	1.20	18.03	149.14	0.61
1	3463.18*	PF 1	21.70	1219.52	1219.64		1219.66	0.009886	1.20	18.02	149.05	0.61
1	3462.18*	PF 1	21.70	1219.51	1219.63		1219.65	0.009863	1.20	18.03	148.97	0.61
1	3461.18*	PF 1	21.70	1219.50	1219.62		1219.64	0.009809	1.20	18.06	148.88	0.61
1	3460.18*	PF 1	21.70	1219.49	1219.61		1219.63	0.009788	1.20	18.06	148.79	0.61
1	3459.18*	PF 1	21.70	1219.48	1219.60		1219.62	0.009766	1.20	18.07	148.71	0.61
1	3458.18*	PF 1	21.70	1219.47	1219.59		1219.61	0.009713	1.20	18.10	148.62	0.61
1	3457.18*	PF 1	21.70	1219.46	1219.58		1219.61	0.009628	1.20	18.14	148.54	0.60
1	3456.18*	PF 1	21.70	1219.45	1219.57		1219.60	0.009512	1.19	18.20	148.46	0.60
1	3455.18*	PF 1	21.70	1219.44	1219.56		1219.59	0.009367	1.19	18.28	148.37	0.60
1	3454.18*	PF 1	21.70	1219.43	1219.55		1219.58	0.009225	1.18	18.36	148.29	0.59

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3453.18*	PF 1	21.70	1219.42	1219.55		1219.57	0.009027	1.17	18.48	148.21	0.59
1	3452.18*	PF 1	21.70	1219.41	1219.54		1219.56	0.008750	1.16	18.65	148.13	0.58
1	3451.18*	PF 1	21.70	1219.40	1219.53		1219.55	0.008402	1.15	18.87	148.06	0.57
1	3450.18*	PF 1	21.70	1219.39	1219.52		1219.54	0.007972	1.13	19.17	147.98	0.55
1	3449.18*	PF 1	21.70	1219.38	1219.51		1219.53	0.007524	1.11	19.50	147.90	0.54
1	3448.18*	PF 1	21.70	1219.37	1219.51		1219.52	0.006981	1.09	19.94	147.84	0.52
1	3447.18*	PF 1	21.70	1219.36	1219.50		1219.52	0.006393	1.06	20.47	147.78	0.50
1	3446.18*	PF 1	21.70	1219.35	1219.49		1219.51	0.005786	1.03	21.09	147.71	0.48
1	3445.18*	PF 1	21.70	1219.34	1219.49		1219.50	0.005208	1.00	21.76	147.66	0.46
1	3444.18*	PF 1	21.70	1219.33	1219.48		1219.50	0.004592	0.96	22.60	147.61	0.43
1	3443.18*	PF 1	21.70	1219.32	1219.48		1219.49	0.004017	0.92	23.52	147.56	0.41
1	3442.18*	PF 1	21.70	1219.31	1219.48		1219.49	0.003515	0.89	24.48	147.51	0.38
1	3441.18*	PF 1	21.70	1219.30	1219.47		1219.49	0.003055	0.85	25.53	147.47	0.36
1	3440.63	PF 1	33.80	1219.29	1219.45		1219.48	0.010671	1.48	22.87	147.31	0.66
1	3366.51	PF 1	33.80	1218.55	1218.72		1218.75	0.009080	1.42	23.86	145.08	0.62
1	3305.78	PF 1	33.80	1217.94	1218.16		1218.20	0.009042	1.69	20.02	93.20	0.64
1	3304.78*	PF 1	33.80	1217.93	1218.15		1218.19	0.009048	1.69	19.98	92.82	0.64
1	3303.78*	PF 1	33.80	1217.92	1218.14		1218.18	0.009037	1.69	19.96	92.45	0.64
1	3302.78*	PF 1	33.80	1217.91	1218.13		1218.17	0.009027	1.70	19.93	92.08	0.64
1	3301.78*	PF 1	33.80	1217.90	1218.12		1218.16	0.009017	1.70	19.91	91.71	0.64
1	3300.78*	PF 1	33.80	1217.89	1218.11		1218.15	0.009009	1.70	19.88	91.33	0.64
1	3299.78*	PF 1	33.80	1217.88	1218.10		1218.15	0.008999	1.70	19.85	90.97	0.64
1	3298.78*	PF 1	33.80	1217.87	1218.09		1218.14	0.008992	1.70	19.83	90.59	0.64
1	3297.78*	PF 1	33.80	1217.86	1218.08		1218.13	0.008984	1.71	19.80	90.23	0.64
1	3296.78*	PF 1	33.80	1217.85	1218.07		1218.12	0.008978	1.71	19.77	89.85	0.64
1	3295.78*	PF 1	33.80	1217.84	1218.06		1218.11	0.008954	1.71	19.75	89.49	0.64
1	3294.78*	PF 1	33.80	1217.83	1218.05		1218.10	0.008933	1.71	19.73	89.11	0.64
1	3293.78*	PF 1	33.80	1217.82	1218.04		1218.09	0.008911	1.71	19.72	88.74	0.64
1	3292.78*	PF 1	33.80	1217.81	1218.03		1218.08	0.008924	1.72	19.68	88.37	0.64
1	3291.78*	PF 1	33.80	1217.80	1218.03		1218.07	0.008902	1.72	19.66	88.00	0.64
1	3290.78*	PF 1	33.80	1217.79	1218.02		1218.06	0.008900	1.72	19.62	87.62	0.64
1	3289.78*	PF 1	33.80	1217.78	1218.01		1218.05	0.008880	1.72	19.60	87.26	0.64
1	3288.78*	PF 1	33.80	1217.77	1218.00		1218.04	0.008879	1.73	19.57	86.88	0.64
1	3287.78*	PF 1	33.80	1217.76	1217.99		1218.03	0.008860	1.73	19.55	86.52	0.64
1	3286.78*	PF 1	33.80	1217.75	1217.98		1218.03	0.008860	1.73	19.52	86.14	0.64
1	3285.78*	PF 1	33.80	1217.74	1217.97		1218.02	0.008843	1.73	19.50	85.77	0.64
1	3284.78*	PF 1	33.80	1217.73	1217.96		1218.01	0.008828	1.74	19.47	85.40	0.64
1	3283.78*	PF 1	33.80	1217.72	1217.95		1218.00	0.008812	1.74	19.45	85.03	0.64

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3282.78*	PF 1	33.80	1217.71	1217.94		1217.99	0.008799	1.74	19.42	84.66	0.64
1	3281.78*	PF 1	33.80	1217.70	1217.93		1217.98	0.008787	1.74	19.40	84.28	0.64
1	3280.78*	PF 1	33.80	1217.69	1217.92		1217.97	0.008760	1.74	19.38	83.91	0.64
1	3279.78*	PF 1	33.80	1217.68	1217.91		1217.96	0.008762	1.75	19.35	83.54	0.64
1	3278.78*	PF 1	33.80	1217.67	1217.90		1217.95	0.008751	1.75	19.32	83.17	0.64
1	3277.78*	PF 1	33.80	1217.66	1217.90		1217.94	0.008739	1.75	19.29	82.80	0.64
1	3276.78*	PF 1	33.80	1217.65	1217.89		1217.93	0.008700	1.75	19.28	82.43	0.64
1	3275.78*	PF 1	33.80	1217.64	1217.88		1217.93	0.008674	1.75	19.27	82.06	0.64
1	3274.78*	PF 1	33.80	1217.63	1217.87		1217.92	0.008637	1.76	19.26	81.69	0.64
1	3273.78*	PF 1	33.80	1217.62	1217.86		1217.91	0.008584	1.76	19.26	81.32	0.64
1	3272.78*	PF 1	33.80	1217.61	1217.85		1217.90	0.008549	1.76	19.24	80.95	0.64
1	3271.78*	PF 1	33.80	1217.60	1217.84		1217.89	0.008512	1.76	19.23	80.59	0.63
1	3270.78*	PF 1	33.80	1217.59	1217.83		1217.88	0.008479	1.76	19.22	80.21	0.63
1	3269.78*	PF 1	33.80	1217.58	1217.82		1217.87	0.008419	1.76	19.23	79.84	0.63
1	3268.78*	PF 1	33.80	1217.57	1217.81		1217.86	0.008371	1.76	19.22	79.48	0.63
1	3267.78*	PF 1	33.80	1217.56	1217.81		1217.85	0.008314	1.76	19.23	79.10	0.63
1	3266.78*	PF 1	33.80	1217.55	1217.80		1217.85	0.008228	1.76	19.25	78.74	0.63
1	3265.78*	PF 1	33.80	1217.54	1217.79		1217.84	0.008160	1.75	19.26	78.37	0.62
1	3264.78*	PF 1	33.80	1217.53	1217.78		1217.83	0.008079	1.75	19.29	78.01	0.62
1	3263.78*	PF 1	33.80	1217.52	1217.77		1217.82	0.008002	1.75	19.31	77.64	0.62
1	3262.78*	PF 1	33.80	1217.51	1217.76		1217.81	0.007912	1.75	19.34	77.28	0.62
1	3261.78*	PF 1	33.80	1217.50	1217.75		1217.80	0.007814	1.74	19.37	76.91	0.61
1	3260.78*	PF 1	33.80	1217.49	1217.75		1217.79	0.007704	1.74	19.42	76.55	0.61
1	3259.78*	PF 1	33.80	1217.48	1217.74		1217.79	0.007576	1.74	19.48	76.18	0.61
1	3258.78*	PF 1	33.80	1217.47	1217.73		1217.78	0.007449	1.73	19.54	75.82	0.60
1	3257.78*	PF 1	33.80	1217.46	1217.72		1217.77	0.013656	1.75	19.32	75.43	0.61
1	3256.78*	PF 1	33.80	1217.44	1217.71		1217.75	0.012624	1.71	19.75	75.10	0.59
1	3255.78*	PF 1	33.80	1217.43	1217.69		1217.74	0.013762	1.76	19.20	74.69	0.61
1	3254.78*	PF 1	33.80	1217.42	1217.67		1217.72	0.015520	1.83	18.48	74.27	0.65
1	3253.78*	PF 1	33.80	1217.41	1217.65		1217.71	0.019770	1.97	17.14	73.79	0.72
1	3253.32	PF 1	33.80	1217.41	1217.60	1217.59900	1217.69	0.040833	2.46	13.75	73.34	1.00
1	3252.32*	PF 1	33.80	1216.12	1216.18	1216.31800	1217.45	2.831095	9.06	3.73	67.66	6.80
1	3251.32*	PF 1	33.80	1214.83	1214.91	1215.03800	1215.66	1.066496	6.96	4.86	62.93	4.41
1	3250.32*	PF 1	33.80	1213.54	1213.62	1213.76000	1214.50	1.241629	7.52	4.50	58.05	4.76
1	3250.17	PF 1	33.80	1213.35	1213.43	1213.57100	1214.30	1.214600	7.51	4.50	57.34	4.72
1	3249.17*	PF 1	33.80	1213.34	1213.48	1213.56200	1213.76	0.178697	4.22	8.01	57.41	1.99
1	3248.17*	PF 1	33.80	1213.33	1213.65	1213.55200	1213.70	0.011299	1.83	18.44	58.21	0.57
1	3247.17*	PF 1	33.80	1213.32	1213.64		1213.69	0.011789	1.86	18.17	57.89	0.59

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3246.17*	PF 1	33.80	1213.31	1213.63		1213.68	0.012428	1.89	17.84	57.58	0.60
1	3245.17*	PF 1	33.80	1213.30	1213.61		1213.67	0.013248	1.94	17.47	57.26	0.62
1	3244.17*	PF 1	33.80	1213.29	1213.60		1213.66	0.014160	1.98	17.08	56.93	0.64
1	3243.17*	PF 1	33.80	1213.28	1213.58		1213.65	0.008183	2.00	16.91	56.62	0.65
1	3242.17*	PF 1	33.80	1213.27	1213.58		1213.64	0.008159	2.00	16.89	56.34	0.64
1	3241.17*	PF 1	33.80	1213.26	1213.57		1213.63	0.008151	2.01	16.86	56.05	0.64
1	3240.17*	PF 1	33.80	1213.25	1213.56		1213.62	0.008126	2.01	16.84	55.77	0.64
1	3239.17*	PF 1	33.80	1213.24	1213.55		1213.61	0.008120	2.01	16.81	55.48	0.64
1	3238.17*	PF 1	33.80	1213.23	1213.54		1213.60	0.008114	2.01	16.78	55.19	0.64
1	3237.17*	PF 1	33.80	1213.22	1213.53		1213.59	0.008095	2.02	16.75	54.90	0.64
1	3236.17*	PF 1	33.80	1213.21	1213.52		1213.59	0.008069	2.02	16.73	54.61	0.64
1	3235.17*	PF 1	33.80	1213.20	1213.51		1213.58	0.008056	2.02	16.71	54.32	0.64
1	3234.17*	PF 1	33.80	1213.19	1213.50		1213.57	0.008040	2.03	16.68	54.04	0.64
1	3233.17*	PF 1	33.80	1213.18	1213.50		1213.56	0.008025	2.03	16.66	53.75	0.64
1	3232.17*	PF 1	33.80	1213.17	1213.49		1213.55	0.008014	2.03	16.63	53.46	0.64
1	3231.17*	PF 1	33.80	1213.16	1213.48		1213.54	0.007990	2.04	16.61	53.18	0.64
1	3230.17*	PF 1	33.80	1213.15	1213.47		1213.53	0.007981	2.04	16.58	52.89	0.64
1	3229.17*	PF 1	33.80	1213.14	1213.46		1213.53	0.007960	2.04	16.55	52.60	0.64
1	3228.17*	PF 1	33.80	1213.13	1213.45		1213.52	0.007942	2.04	16.53	52.31	0.64
1	3227.17*	PF 1	33.80	1213.12	1213.44		1213.51	0.007923	2.05	16.50	52.03	0.64
1	3226.17*	PF 1	33.80	1213.11	1213.44		1213.50	0.007905	2.05	16.48	51.75	0.64
1	3225.17*	PF 1	33.80	1213.10	1213.43		1213.49	0.007891	2.05	16.45	51.46	0.64
1	3224.17*	PF 1	33.80	1213.09	1213.42		1213.48	0.007887	2.06	16.42	51.16	0.64
1	3223.17*	PF 1	33.80	1213.08	1213.41		1213.47	0.007872	2.06	16.39	50.88	0.64
1	3222.17*	PF 1	33.80	1213.07	1213.40		1213.47	0.007871	2.07	16.35	50.59	0.64
1	3221.17*	PF 1	33.80	1213.06	1213.39		1213.46	0.007870	2.07	16.32	50.30	0.64
1	3220.17*	PF 1	33.80	1213.05	1213.38		1213.45	0.007855	2.07	16.29	50.02	0.64
1	3219.17*	PF 1	33.80	1213.04	1213.37		1213.44	0.007846	2.08	16.26	49.73	0.64
1	3218.17*	PF 1	33.80	1213.03	1213.37		1213.43	0.007849	2.08	16.22	49.44	0.64
1	3217.17*	PF 1	33.80	1213.02	1213.36		1213.42	0.007840	2.09	16.19	49.16	0.64
1	3216.17*	PF 1	33.80	1213.01	1213.35		1213.42	0.007844	2.09	16.15	48.87	0.64
1	3215.17*	PF 1	33.80	1213.00	1213.34		1213.41	0.007849	2.10	16.10	48.57	0.64
1	3214.17*	PF 1	33.80	1212.99	1213.33		1213.40	0.007840	2.10	16.07	48.30	0.64
1	3213.17*	PF 1	33.80	1212.98	1213.32		1213.39	0.007847	2.11	16.03	48.01	0.64
1	3212.17*	PF 1	33.80	1212.97	1213.31		1213.38	0.007852	2.11	15.99	47.72	0.64
1	3211.17*	PF 1	33.80	1212.96	1213.30		1213.37	0.007861	2.12	15.94	47.43	0.64
1	3210.17*	PF 1	33.80	1212.95	1213.30		1213.37	0.007871	2.13	15.90	47.14	0.65
1	3209.17*	PF 1	33.80	1212.94	1213.29		1213.36	0.007879	2.13	15.86	46.86	0.65

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3208.17*	PF 1	33.80	1212.93	1213.28		1213.35	0.007897	2.14	15.81	46.57	0.65
1	3207.17*	PF 1	33.80	1212.92	1213.27		1213.34	0.007920	2.15	15.75	46.28	0.65
1	3206.17*	PF 1	33.80	1212.91	1213.26		1213.33	0.007931	2.15	15.71	46.00	0.65
1	3205.17*	PF 1	33.80	1212.90	1213.25		1213.32	0.007965	2.16	15.65	45.70	0.65
1	3204.17*	PF 1	33.80	1212.89	1213.24		1213.32	0.008000	2.17	15.59	45.41	0.65
1	3203.17*	PF 1	33.80	1212.88	1213.23		1213.31	0.008033	2.18	15.53	45.13	0.65
1	3202.17*	PF 1	33.80	1212.87	1213.22		1213.30	0.008070	2.19	15.47	44.83	0.66
1	3201.17*	PF 1	33.80	1212.86	1213.21		1213.29	0.008114	2.19	15.40	44.55	0.66
1	3200.17*	PF 1	33.80	1212.85	1213.21		1213.28	0.008159	2.20	15.34	44.26	0.66
1	3199.17*	PF 1	33.80	1212.84	1213.20		1213.27	0.008228	2.22	15.26	43.96	0.66
1	3198.17*	PF 1	33.80	1212.83	1213.19		1213.26	0.008295	2.23	15.18	43.68	0.67
1	3197.17*	PF 1	33.80	1212.82	1213.18		1213.26	0.008377	2.24	15.10	43.38	0.67
1	3196.17*	PF 1	33.80	1212.81	1213.17		1213.25	0.008479	2.25	15.00	43.08	0.67
1	3195.17*	PF 1	33.80	1212.80	1213.16		1213.24	0.008576	2.27	14.91	42.80	0.68
1	3194.17*	PF 1	33.80	1212.79	1213.15		1213.23	0.008703	2.28	14.80	42.50	0.68
1	3193.17*	PF 1	33.80	1212.78	1213.14		1213.22	0.008833	2.30	14.70	42.20	0.69
1	3192.17*	PF 1	33.80	1212.77	1213.13		1213.21	0.008971	2.32	14.59	41.91	0.69
1	3191.17*	PF 1	33.80	1212.76	1213.12		1213.20	0.009149	2.34	14.46	41.61	0.70
1	3190.17*	PF 1	33.80	1212.75	1213.11		1213.19	0.009342	2.36	14.33	41.31	0.71
1	3189.17*	PF 1	33.80	1212.74	1213.10		1213.18	0.009568	2.38	14.18	41.01	0.71
1	3188.17*	PF 1	33.80	1212.73	1213.08		1213.17	0.009824	2.41	14.03	40.71	0.72
1	3187.17*	PF 1	33.80	1212.72	1213.07		1213.17	0.010152	2.44	13.85	40.40	0.73
1	3186.18	PF 1	33.80	1212.71	1213.06		1213.16	0.010537	2.47	13.66	40.10	0.75
1	3091.83	PF 1	33.80	1211.75	1212.05		1212.13	0.011198	2.32	14.57	49.41	0.75
1	3030.37	PF 1	33.80	1211.13	1211.39		1211.45	0.010915	2.06	16.44	65.55	0.72
1	3029.37*	PF 1	33.80	1211.12	1211.37		1211.44	0.010909	2.05	16.47	65.84	0.72
1	3028.37*	PF 1	33.80	1211.11	1211.36		1211.43	0.010919	2.05	16.49	66.13	0.72
1	3027.37*	PF 1	33.80	1211.10	1211.35		1211.42	0.010933	2.05	16.52	66.43	0.72
1	3026.37*	PF 1	33.80	1211.09	1211.34		1211.41	0.010948	2.04	16.54	66.72	0.72
1	3025.37*	PF 1	33.80	1211.08	1211.33		1211.40	0.010960	2.04	16.56	67.03	0.72
1	3024.37*	PF 1	33.80	1211.07	1211.32		1211.38	0.010977	2.04	16.59	67.33	0.72
1	3023.37*	PF 1	33.80	1211.06	1211.31		1211.37	0.011030	2.04	16.59	67.62	0.73
1	3022.37*	PF 1	33.80	1211.05	1211.30		1211.36	0.011085	2.04	16.60	67.92	0.73
1	3021.37*	PF 1	33.80	1211.04	1211.29		1211.35	0.011120	2.03	16.61	68.23	0.73
1	3020.37*	PF 1	33.80	1211.03	1211.28		1211.34	0.011177	2.03	16.61	68.53	0.73
1	3019.37*	PF 1	33.80	1211.02	1211.26		1211.33	0.011274	2.04	16.60	68.84	0.73
1	3018.37*	PF 1	33.80	1211.01	1211.25		1211.32	0.011408	2.04	16.57	69.14	0.73
1	3017.37*	PF 1	33.80	1211.00	1211.24		1211.31	0.011511	2.04	16.56	69.45	0.74

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	3016.37*	PF 1	33.80	1210.98	1211.23		1211.29	0.009575	1.93	17.54	69.84	0.68
1	3015.37*	PF 1	33.80	1210.97	1211.23		1211.28	0.009361	1.91	17.69	70.17	0.67
1	3014.37*	PF 1	33.80	1210.96	1211.22		1211.27	0.009126	1.89	17.86	70.49	0.66
1	3013.37*	PF 1	33.80	1210.95	1211.21		1211.26	0.008870	1.87	18.04	70.82	0.65
1	3012.37*	PF 1	33.80	1210.94	1211.20		1211.25	0.008592	1.85	18.25	71.15	0.64
1	3011.37*	PF 1	33.80	1210.93	1211.19		1211.24	0.008315	1.83	18.46	71.48	0.63
1	3010.37*	PF 1	33.80	1210.92	1211.18		1211.23	0.007998	1.81	18.72	71.81	0.62
1	3009.37*	PF 1	33.80	1210.91	1211.18		1211.23	0.007661	1.78	18.99	72.14	0.61
1	3008.37*	PF 1	33.80	1210.90	1211.17		1211.22	0.013635	1.78	19.02	72.46	0.61
1	3007.37*	PF 1	33.80	1210.89	1211.15		1211.20	0.014556	1.81	18.68	72.74	0.63
1	3006.37*	PF 1	33.80	1210.88	1211.13		1211.19	0.016076	1.86	18.16	73.01	0.66
1	3005.37*	PF 1	33.80	1210.87	1211.11		1211.17	0.019329	1.96	17.20	73.25	0.71
1	3004.37*	PF 1	33.80	1210.86	1211.07		1211.15	0.029979	2.24	15.09	73.39	0.87
1	3004.33	PF 1	33.80	1210.86	1211.07	1211.06500	1211.15	0.031241	2.27	14.91	73.39	0.89
1	3003.33*	PF 1	33.80	1210.01	1210.08	1210.20800	1210.97	1.563808	7.56	4.47	67.99	5.20
1	3002.33*	PF 1	33.80	1209.17	1209.26	1209.37600	1209.85	0.725106	6.17	5.48	63.55	3.71
1	3001.33*	PF 1	33.80	1208.32	1208.41	1208.53700	1209.07	0.796874	6.54	5.17	58.99	3.89
1	3000.32*	PF 1	33.80	1207.47	1207.56	1207.70000	1208.27	0.793117	6.74	5.01	54.46	3.92
1	2999.32*	PF 1	33.80	1206.62	1206.72	1206.86300	1207.47	0.784191	6.96	4.86	49.92	3.93
1	2998.41	PF 1	33.80	1205.85	1205.95	1206.10700	1206.75	0.773182	7.17	4.71	45.79	3.94
1	2997.41*	PF 1	33.80	1205.84	1206.01	1206.09400	1206.31	0.158561	4.43	7.64	46.59	1.93
1	2996.41*	PF 1	33.80	1205.83	1206.17	1206.08300	1206.24	0.014684	2.14	15.79	48.04	0.66
1	2995.41*	PF 1	33.80	1205.82	1206.15		1206.22	0.015360	2.16	15.63	48.45	0.67
1	2994.41*	PF 1	33.80	1205.81	1206.13		1206.21	0.016404	2.20	15.37	48.83	0.69
1	2993.41*	PF 1	33.80	1205.80	1206.11		1206.19	0.018075	2.26	14.98	49.19	0.72
1	2992.41*	PF 1	33.80	1205.79	1206.09		1206.17	0.020054	2.32	14.56	49.55	0.76
1	2991.41*	PF 1	33.80	1205.78	1206.07		1206.16	0.011719	2.34	14.44	49.97	0.77
1	2990.41*	PF 1	33.80	1205.77	1206.06		1206.15	0.011708	2.33	14.49	50.39	0.77
1	2989.41*	PF 1	33.80	1205.76	1206.05		1206.14	0.011687	2.32	14.55	50.80	0.77
1	2988.41*	PF 1	33.80	1205.75	1206.04		1206.12	0.011681	2.32	14.60	51.22	0.76
1	2987.41*	PF 1	33.80	1205.74	1206.03		1206.11	0.011673	2.31	14.65	51.65	0.76
1	2986.41*	PF 1	33.80	1205.73	1206.02		1206.10	0.011656	2.30	14.70	52.07	0.76
1	2985.41*	PF 1	33.80	1205.72	1206.01		1206.09	0.011625	2.29	14.76	52.50	0.76
1	2984.41*	PF 1	33.80	1205.71	1206.00		1206.08	0.011596	2.28	14.82	52.92	0.76
1	2983.41*	PF 1	33.80	1205.70	1205.98		1206.06	0.011586	2.27	14.87	53.34	0.76
1	2982.41*	PF 1	33.80	1205.69	1205.97		1206.05	0.011558	2.26	14.93	53.77	0.76
1	2981.41*	PF 1	33.80	1205.68	1205.96		1206.04	0.011553	2.26	14.98	54.19	0.76
1	2980.41*	PF 1	33.80	1205.67	1205.95		1206.03	0.011534	2.25	15.03	54.62	0.76

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2979.41*	PF 1	33.80	1205.66	1205.94		1206.02	0.011500	2.24	15.09	55.04	0.75
1	2978.41*	PF 1	33.80	1205.65	1205.93		1206.01	0.011481	2.23	15.15	55.47	0.75
1	2977.41*	PF 1	33.80	1205.64	1205.92		1205.99	0.011468	2.22	15.20	55.90	0.75
1	2976.41*	PF 1	33.80	1205.63	1205.91		1205.98	0.011458	2.22	15.25	56.32	0.75
1	2975.41*	PF 1	33.80	1205.62	1205.89		1205.97	0.011449	2.21	15.30	56.74	0.75
1	2974.41*	PF 1	33.80	1205.61	1205.88		1205.96	0.011405	2.20	15.36	57.17	0.75
1	2973.41*	PF 1	33.80	1205.60	1205.87		1205.95	0.011383	2.19	15.42	57.60	0.75
1	2972.41*	PF 1	33.80	1205.59	1205.86		1205.94	0.011368	2.19	15.47	58.01	0.75
1	2971.41*	PF 1	33.80	1205.58	1205.85		1205.92	0.011351	2.18	15.52	58.44	0.75
1	2970.41*	PF 1	33.80	1205.57	1205.84		1205.91	0.011353	2.17	15.56	58.86	0.74
1	2969.41*	PF 1	33.80	1205.56	1205.83		1205.90	0.011335	2.16	15.62	59.29	0.74
1	2968.41*	PF 1	33.80	1205.55	1205.82		1205.89	0.011306	2.16	15.67	59.72	0.74
1	2967.41*	PF 1	33.80	1205.54	1205.81		1205.88	0.011279	2.15	15.73	60.14	0.74
1	2966.41*	PF 1	33.80	1205.53	1205.79		1205.87	0.011254	2.14	15.78	60.56	0.74
1	2965.41*	PF 1	33.80	1205.52	1205.78		1205.85	0.011227	2.13	15.84	61.00	0.74
1	2964.41*	PF 1	33.80	1205.51	1205.77		1205.84	0.011188	2.13	15.90	61.42	0.74
1	2963.41*	PF 1	33.80	1205.50	1205.76		1205.83	0.011150	2.12	15.96	61.85	0.74
1	2962.41*	PF 1	33.80	1205.49	1205.75		1205.82	0.011114	2.11	16.02	62.27	0.73
1	2961.41*	PF 1	33.80	1205.48	1205.74		1205.81	0.011076	2.10	16.08	62.71	0.73
1	2960.41*	PF 1	33.80	1205.47	1205.73		1205.80	0.011009	2.09	16.15	63.13	0.73
1	2959.41*	PF 1	33.80	1205.46	1205.72		1205.79	0.010943	2.08	16.23	63.56	0.73
1	2958.41*	PF 1	33.80	1205.45	1205.71		1205.78	0.010862	2.07	16.31	63.99	0.72
1	2957.41*	PF 1	33.80	1205.44	1205.70		1205.76	0.010765	2.06	16.39	64.42	0.72
1	2956.41*	PF 1	33.80	1205.43	1205.69		1205.75	0.010684	2.05	16.47	64.85	0.72
1	2955.41*	PF 1	33.80	1205.42	1205.68		1205.74	0.010578	2.04	16.57	65.27	0.71
1	2955.4	PF 1	33.80	1205.42	1205.68		1205.74	0.010591	2.04	16.56	65.28	0.71
1	2914.65	PF 1	33.80	1205.01	1205.24		1205.30	0.010520	1.91	17.66	76.28	0.70
1	2815.59	PF 1	33.80	1204.02	1204.21		1204.25	0.010565	1.65	20.46	110.60	0.68
1	2782.59	PF 1	33.80	1203.69	1203.87		1203.91	0.010055	1.57	21.50	120.68	0.66
1	2743.58	PF 1	33.80	1203.30	1203.47		1203.51	0.010166	1.55	21.80	125.91	0.66
1	2742.58*	PF 1	33.80	1203.29	1203.46		1203.50	0.010167	1.55	21.81	126.05	0.66
1	2741.58*	PF 1	33.80	1203.28	1203.45		1203.49	0.010192	1.55	21.80	126.19	0.66
1	2740.58*	PF 1	33.80	1203.27	1203.44		1203.48	0.010168	1.55	21.83	126.34	0.66
1	2739.58*	PF 1	33.80	1203.26	1203.43		1203.47	0.010193	1.55	21.82	126.48	0.66
1	2738.58*	PF 1	33.80	1203.25	1203.42		1203.46	0.010220	1.55	21.81	126.61	0.66
1	2737.58*	PF 1	33.80	1203.24	1203.41		1203.45	0.010245	1.55	21.80	126.75	0.66
1	2736.58*	PF 1	33.80	1203.23	1203.40		1203.44	0.010295	1.55	21.78	126.89	0.66
1	2735.58*	PF 1	33.80	1203.22	1203.39		1203.43	0.010370	1.55	21.74	127.02	0.66

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2734.58*	PF 1	33.80	1203.21	1203.38		1203.42	0.010493	1.56	21.68	127.17	0.67
1	2733.58*	PF 1	33.80	1203.20	1203.37		1203.41	0.010647	1.57	21.59	127.30	0.67
1	2732.58*	PF 1	33.80	1203.19	1203.36		1203.40	0.010855	1.57	21.47	127.44	0.68
1	2731.58*	PF 1	33.80	1203.18	1203.35		1203.39	0.011286	1.59	21.23	127.56	0.69
1	2730.58*	PF 1	33.80	1203.17	1203.33		1203.38	0.011916	1.62	20.90	127.69	0.70
1	2729.58*	PF 1	33.80	1203.16	1203.32		1203.36	0.012659	1.65	20.53	127.80	0.72
1	2728.58*	PF 1	33.80	1203.14	1203.31		1203.35	0.010018	1.53	22.04	128.02	0.65
1	2727.58*	PF 1	33.80	1203.13	1203.30		1203.34	0.009972	1.53	22.08	128.16	0.65
1	2726.58*	PF 1	33.80	1203.12	1203.29		1203.33	0.009950	1.53	22.10	128.30	0.65
1	2725.58*	PF 1	33.80	1203.11	1203.28		1203.32	0.009905	1.53	22.14	128.44	0.65
1	2724.58*	PF 1	33.80	1203.10	1203.27		1203.31	0.009860	1.52	22.18	128.58	0.65
1	2723.58*	PF 1	33.80	1203.09	1203.26		1203.30	0.009792	1.52	22.24	128.72	0.64
1	2722.58*	PF 1	33.80	1203.08	1203.25		1203.29	0.009724	1.52	22.30	128.87	0.64
1	2721.58*	PF 1	33.80	1203.07	1203.24		1203.28	0.009612	1.51	22.38	129.01	0.64
1	2720.58*	PF 1	33.80	1203.06	1203.24		1203.27	0.009526	1.51	22.45	129.15	0.64
1	2719.58*	PF 1	33.80	1203.05	1203.23		1203.26	0.009395	1.50	22.56	129.29	0.63
1	2718.57*	PF 1	33.80	1203.04	1203.22		1203.25	0.009245	1.49	22.68	129.44	0.63
1	2717.57*	PF 1	33.80	1203.03	1203.21		1203.24	0.009077	1.48	22.81	129.58	0.62
1	2716.57*	PF 1	33.80	1203.02	1203.20		1203.23	0.008850	1.47	23.00	129.74	0.62
1	2715.57*	PF 1	33.80	1203.01	1203.19		1203.22	0.008593	1.46	23.21	129.89	0.61
1	2714.57*	PF 1	33.80	1203.00	1203.18		1203.21	0.008289	1.44	23.47	130.04	0.60
1	2713.57*	PF 1	33.80	1202.99	1203.17		1203.21	0.007945	1.42	23.79	130.19	0.59
1	2712.57*	PF 1	33.80	1202.98	1203.17		1203.20	0.007586	1.40	24.13	130.35	0.57
1	2711.57*	PF 1	33.80	1202.97	1203.16		1203.19	0.007201	1.38	24.52	130.49	0.56
1	2710.57*	PF 1	33.80	1202.96	1203.15		1203.18	0.006782	1.35	24.98	130.66	0.55
1	2709.57*	PF 1	33.80	1202.95	1203.14		1203.17	0.011853	1.35	25.12	130.81	0.54
1	2708.57*	PF 1	33.80	1202.94	1203.13		1203.16	0.012501	1.37	24.73	130.93	0.55
1	2707.57*	PF 1	33.80	1202.93	1203.12		1203.15	0.013578	1.40	24.13	131.04	0.58
1	2706.57*	PF 1	33.80	1202.92	1203.10		1203.13	0.015539	1.46	23.18	131.13	0.61
1	2705.57*	PF 1	33.80	1202.91	1203.07		1203.11	0.021734	1.61	20.96	131.17	0.71
1	2704.94	PF 1	33.80	1202.90	1203.03	1203.02800	1203.09	0.046149	2.02	16.72	131.07	1.00
1	2703.94*	PF 1	33.80	1202.01	1202.05	1202.14100	1202.87	3.089587	7.26	4.66	125.57	6.65
1	2702.94*	PF 1	33.80	1201.13	1201.19	1201.26400	1201.52	0.628997	4.57	7.39	120.77	3.26
1	2701.94*	PF 1	33.80	1200.24	1200.30	1200.37800	1200.73	0.963430	5.29	6.39	115.78	3.97
1	2700.94*	PF 1	33.80	1199.35	1199.41	1199.49300	1199.82	0.837743	5.16	6.55	110.85	3.74
1	2700.54	PF 1	33.80	1199.00	1199.06	1199.14400	1199.49	0.868102	5.25	6.44	108.90	3.81
1	2699.54*	PF 1	33.80	1198.99	1199.21	1199.13500	1199.24	0.011603	1.43	23.59	110.00	0.55
1	2698.54*	PF 1	33.80	1198.98	1199.19		1199.23	0.012015	1.45	23.36	110.16	0.55

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2697.54*	PF 1	33.80	1198.97	1199.18		1199.21	0.012614	1.47	23.03	110.32	0.57
1	2696.54*	PF 1	33.80	1198.96	1199.17		1199.20	0.013521	1.50	22.57	110.46	0.58
1	2695.54*	PF 1	33.80	1198.95	1199.15		1199.19	0.014969	1.54	21.90	110.58	0.61
1	2694.54*	PF 1	33.80	1198.94	1199.13		1199.17	0.017092	1.61	21.05	110.71	0.65
1	2693.54*	PF 1	33.80	1198.93	1199.12		1199.16	0.010201	1.63	20.69	110.86	0.67
1	2692.54*	PF 1	33.80	1198.92	1199.11		1199.15	0.010190	1.63	20.71	111.04	0.67
1	2691.54*	PF 1	33.80	1198.91	1199.10		1199.14	0.010158	1.63	20.75	111.20	0.67
1	2690.54*	PF 1	33.80	1198.90	1199.09		1199.13	0.010171	1.63	20.75	111.37	0.67
1	2689.54*	PF 1	33.80	1198.89	1199.08		1199.12	0.010184	1.63	20.75	111.54	0.67
1	2688.54*	PF 1	33.80	1198.88	1199.07		1199.11	0.010175	1.63	20.77	111.71	0.67
1	2687.54*	PF 1	33.80	1198.87	1199.06		1199.10	0.010164	1.63	20.79	111.89	0.66
1	2686.54*	PF 1	33.80	1198.86	1199.05		1199.09	0.010157	1.62	20.81	112.05	0.66
1	2685.54*	PF 1	33.80	1198.85	1199.04		1199.08	0.010170	1.62	20.81	112.22	0.66
1	2684.54*	PF 1	33.80	1198.84	1199.03		1199.07	0.010184	1.62	20.82	112.39	0.67
1	2683.54*	PF 1	33.80	1198.83	1199.02		1199.06	0.010175	1.62	20.84	112.56	0.66
1	2682.54*	PF 1	33.80	1198.82	1199.01		1199.05	0.010142	1.62	20.87	112.74	0.66
1	2681.54*	PF 1	33.80	1198.81	1199.00		1199.04	0.010134	1.62	20.89	112.90	0.66
1	2680.54*	PF 1	33.80	1198.80	1198.99		1199.03	0.010103	1.62	20.92	113.08	0.66
1	2679.54*	PF 1	33.80	1198.79	1198.98		1199.02	0.010072	1.61	20.95	113.25	0.66
1	2678.54*	PF 1	33.80	1198.78	1198.97		1199.01	0.010022	1.61	20.99	113.41	0.66
1	2677.54*	PF 1	33.80	1198.77	1198.96		1199.00	0.009968	1.61	21.04	113.59	0.66
1	2676.54*	PF 1	33.80	1198.76	1198.95		1198.99	0.009916	1.60	21.09	113.76	0.66
1	2675.54*	PF 1	33.80	1198.75	1198.94		1198.98	0.009843	1.60	21.15	113.93	0.65
1	2674.54*	PF 1	33.80	1198.74	1198.93		1198.97	0.009750	1.59	21.22	114.10	0.65
1	2673.54*	PF 1	33.80	1198.73	1198.92		1198.96	0.009657	1.59	21.29	114.27	0.65
1	2672.54*	PF 1	33.80	1198.72	1198.91		1198.95	0.009543	1.58	21.38	114.46	0.64
1	2671.54*	PF 1	33.80	1198.71	1198.90		1198.94	0.009392	1.57	21.50	114.63	0.64
1	2670.54*	PF 1	33.80	1198.70	1198.89		1198.93	0.009224	1.56	21.63	114.81	0.63
1	2669.54*	PF 1	33.80	1198.69	1198.88		1198.92	0.009022	1.55	21.79	114.97	0.63
1	2668.54*	PF 1	33.80	1198.68	1198.87		1198.91	0.008824	1.54	21.94	115.15	0.62
1	2667.54*	PF 1	33.80	1198.67	1198.86		1198.90	0.008558	1.53	22.16	115.34	0.61
1	2666.54*	PF 1	33.80	1198.66	1198.86		1198.89	0.008268	1.51	22.41	115.52	0.60
1	2665.54*	PF 1	33.80	1198.65	1198.85		1198.88	0.007941	1.49	22.69	115.70	0.59
1	2664.54*	PF 1	33.80	1198.64	1198.84		1198.87	0.007599	1.47	23.01	115.89	0.58
1	2663.54*	PF 1	33.80	1198.63	1198.83		1198.87	0.007245	1.45	23.36	116.08	0.57
1	2662.54*	PF 1	33.80	1198.62	1198.83		1198.86	0.006858	1.42	23.76	116.27	0.55
1	2661.54*	PF 1	33.80	1198.61	1198.82		1198.85	0.006446	1.40	24.22	116.46	0.54
1	2661.04	PF 1	33.80	1198.60	1198.82	1198.73700	1198.85	0.005685	1.34	25.16	116.59	0.51

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2616.7	PF 1	33.80	1198.16	1198.30	1198.30200	1198.37	0.025031	2.12	15.92	112.86	1.00
1	2540.68	PF 1	33.80	1197.39	1197.70	1197.53500	1197.72	0.001906	0.99	34.08	109.67	0.31
1	2481.7	PF 1	33.80	1196.79	1197.71		1197.71	0.000039	0.29	118.15	133.14	0.05
1	2409.33	PF 1	33.80	1196.06	1197.71		1197.71	0.000005	0.14	233.84	147.00	0.02
1	2320.35	PF 1	37.50	1195.17	1197.71	1195.34500	1197.71	0.000003	0.15	247.43	105.19	0.02
1	2300		Culvert									
1	2119.93	PF 1	37.50	1185.98	1186.24	1186.22300	1186.34	0.016928	2.59	14.48	56.71	0.90
1	2068.55	PF 1	37.50	1185.47	1185.74		1185.79	0.007150	1.74	21.57	80.60	0.59
1	2000.07	PF 1	37.50	1184.78	1185.09		1185.18	0.011419	2.39	15.72	51.84	0.76
1	1943.65	PF 1	37.50	1184.21	1184.54		1184.61	0.008884	2.19	17.10	53.00	0.68
1	1862.48	PF 1	37.50	1183.39	1183.73		1183.82	0.010726	2.44	15.34	46.50	0.75
1	1861.48*	PF 1	37.50	1183.38	1183.72		1183.81	0.010779	2.45	15.33	46.58	0.75
1	1860.48*	PF 1	37.50	1183.37	1183.71		1183.80	0.010859	2.45	15.30	46.65	0.75
1	1859.48*	PF 1	37.50	1183.36	1183.69		1183.79	0.010976	2.46	15.26	46.71	0.76
1	1858.48*	PF 1	37.50	1183.35	1183.68		1183.78	0.011099	2.46	15.22	46.78	0.76
1	1857.48*	PF 1	37.50	1183.34	1183.67		1183.77	0.011252	2.47	15.16	46.85	0.77
1	1856.48*	PF 1	37.50	1183.33	1183.66		1183.76	0.011437	2.48	15.10	46.91	0.77
1	1855.48*	PF 1	37.50	1183.32	1183.65		1183.74	0.011622	2.49	15.03	46.96	0.78
1	1854.48*	PF 1	37.50	1183.30	1183.64		1183.73	0.010508	2.42	15.51	47.10	0.74
1	1853.48*	PF 1	37.50	1183.29	1183.63		1183.72	0.010522	2.42	15.51	47.17	0.74
1	1852.48*	PF 1	37.50	1183.28	1183.62		1183.71	0.010536	2.42	15.52	47.25	0.74
1	1851.48*	PF 1	37.50	1183.27	1183.61		1183.70	0.010585	2.42	15.50	47.31	0.74
1	1850.48*	PF 1	37.50	1183.26	1183.59		1183.69	0.010613	2.42	15.50	47.39	0.75
1	1849.48*	PF 1	37.50	1183.25	1183.58		1183.68	0.010641	2.42	15.50	47.46	0.75
1	1848.48*	PF 1	37.50	1183.24	1183.57		1183.66	0.010695	2.42	15.49	47.54	0.75
1	1847.48*	PF 1	37.50	1183.23	1183.56		1183.65	0.010754	2.42	15.47	47.60	0.75
1	1846.48*	PF 1	37.50	1183.22	1183.55		1183.64	0.010828	2.43	15.45	47.67	0.75
1	1845.48*	PF 1	37.50	1183.21	1183.54		1183.63	0.010911	2.43	15.42	47.74	0.75
1	1844.48*	PF 1	37.50	1183.20	1183.53		1183.62	0.011023	2.44	15.38	47.81	0.76
1	1843.48*	PF 1	37.50	1183.19	1183.52		1183.61	0.011183	2.45	15.32	47.87	0.76
1	1842.48*	PF 1	37.50	1183.18	1183.51		1183.60	0.011403	2.46	15.24	47.93	0.77
1	1841.48*	PF 1	37.50	1183.17	1183.49		1183.59	0.011581	2.47	15.18	48.00	0.77
1	1840.48*	PF 1	37.50	1183.15	1183.48		1183.57	0.010433	2.39	15.68	48.13	0.74
1	1839.48*	PF 1	37.50	1183.14	1183.47		1183.56	0.010453	2.39	15.68	48.20	0.74
1	1838.48*	PF 1	37.50	1183.13	1183.46		1183.55	0.010456	2.39	15.69	48.28	0.74
1	1837.48*	PF 1	37.50	1183.12	1183.45		1183.54	0.010476	2.39	15.69	48.35	0.74
1	1836.48*	PF 1	37.50	1183.11	1183.44		1183.53	0.010492	2.39	15.69	48.42	0.74
1	1835.48*	PF 1	37.50	1183.10	1183.43		1183.52	0.010512	2.39	15.69	48.49	0.74

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1834.48*	PF 1	37.50	1183.09	1183.42		1183.51	0.010515	2.39	15.70	48.57	0.74
1	1833.48*	PF 1	37.50	1183.08	1183.41		1183.50	0.010536	2.39	15.70	48.64	0.74
1	1832.48*	PF 1	37.50	1183.07	1183.40		1183.49	0.010552	2.39	15.70	48.71	0.74
1	1831.48*	PF 1	37.50	1183.06	1183.39		1183.48	0.010613	2.39	15.68	48.78	0.74
1	1830.48*	PF 1	37.50	1183.05	1183.38		1183.47	0.010643	2.39	15.68	48.86	0.74
1	1829.48*	PF 1	37.50	1183.04	1183.37		1183.46	0.010718	2.40	15.65	48.92	0.75
1	1828.48*	PF 1	37.50	1183.03	1183.36		1183.45	0.010789	2.40	15.63	49.00	0.75
1	1827.48*	PF 1	37.50	1183.02	1183.35		1183.43	0.010839	2.40	15.62	49.06	0.75
1	1826.48*	PF 1	37.50	1183.00	1183.34		1183.42	0.009468	2.30	16.29	49.22	0.71
1	1825.48*	PF 1	37.50	1182.99	1183.33		1183.41	0.009356	2.29	16.36	49.30	0.70
1	1824.48*	PF 1	37.50	1182.98	1183.32		1183.40	0.009240	2.28	16.43	49.38	0.70
1	1823.48*	PF 1	37.50	1182.97	1183.31		1183.39	0.009113	2.27	16.51	49.46	0.69
1	1822.48*	PF 1	37.50	1182.96	1183.30		1183.38	0.008975	2.26	16.59	49.54	0.69
1	1821.48*	PF 1	37.50	1182.95	1183.29		1183.37	0.008828	2.25	16.69	49.63	0.68
1	1820.48*	PF 1	37.50	1182.94	1183.29		1183.36	0.008678	2.23	16.79	49.71	0.68
1	1819.48*	PF 1	37.50	1182.93	1183.28		1183.35	0.008541	2.22	16.88	49.79	0.67
1	1818.48*	PF 1	37.50	1182.92	1183.27		1183.34	0.008364	2.21	17.00	49.88	0.67
1	1817.48*	PF 1	37.50	1182.91	1183.26		1183.34	0.008181	2.19	17.12	49.97	0.66
1	1816.48*	PF 1	37.50	1182.90	1183.25		1183.33	0.007994	2.17	17.25	50.07	0.65
1	1815.48*	PF 1	37.50	1182.89	1183.24		1183.31	0.014528	2.19	17.15	50.11	0.66
1	1814.48*	PF 1	37.50	1182.88	1183.22		1183.30	0.015674	2.24	16.76	50.14	0.68
1	1813.48*	PF 1	37.50	1182.87	1183.20		1183.28	0.017515	2.31	16.22	50.15	0.72
1	1812.48*	PF 1	37.50	1182.86	1183.17		1183.27	0.020695	2.43	15.42	50.13	0.77
1	1811.48*	PF 1	37.50	1182.84	1183.15		1183.24	0.022077	2.48	15.13	50.16	0.80
1	1811.06	PF 1	37.50	1182.84	1183.10	1183.10400	1183.23	0.036813	2.90	12.95	49.93	1.00
1	1810.06*	PF 1	37.50	1182.35	1182.48	1182.62000	1183.09	0.436236	6.28	5.97	46.13	3.07
1	1809.06*	PF 1	37.50	1181.87	1182.01	1182.15900	1182.65	0.434504	6.44	5.83	43.17	3.09
1	1808.06*	PF 1	37.50	1181.38	1181.52	1181.68200	1182.21	0.439387	6.64	5.64	40.21	3.13
1	1807.36	PF 1	37.50	1181.04	1181.19	1181.35300	1181.90	0.435568	6.77	5.54	38.13	3.13
1	1806.36*	PF 1	37.50	1181.03	1181.24	1181.34200	1181.58	0.126861	4.64	8.07	38.76	1.79
1	1805.36*	PF 1	37.50	1181.02	1181.42	1181.32900	1181.51	0.014630	2.39	15.67	40.15	0.68
1	1804.36*	PF 1	37.50	1181.01	1181.41		1181.50	0.015286	2.42	15.49	40.35	0.69
1	1803.36*	PF 1	37.50	1181.00	1181.39		1181.48	0.016209	2.46	15.25	40.54	0.71
1	1802.36*	PF 1	37.50	1180.99	1181.37		1181.47	0.017507	2.51	14.93	40.73	0.73
1	1801.36*	PF 1	37.50	1180.98	1181.35		1181.45	0.018872	2.56	14.62	40.92	0.76
1	1800.36*	PF 1	37.50	1180.97	1181.33		1181.44	0.010844	2.58	14.56	41.14	0.76
1	1799.36*	PF 1	37.50	1180.96	1181.32		1181.43	0.010720	2.56	14.65	41.39	0.76
1	1798.36*	PF 1	37.50	1180.95	1181.31		1181.41	0.010591	2.55	14.73	41.63	0.75

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1797.36*	PF 1	37.50	1180.94	1181.30		1181.40	0.010435	2.53	14.83	41.88	0.75
1	1796.36*	PF 1	37.50	1180.93	1181.29		1181.39	0.010288	2.51	14.93	42.12	0.74
1	1795.36*	PF 1	37.50	1180.92	1181.29		1181.38	0.010110	2.49	15.04	42.37	0.74
1	1794.36*	PF 1	37.50	1180.91	1181.28		1181.37	0.009897	2.47	15.18	42.62	0.73
1	1793.36*	PF 1	37.50	1180.90	1181.27		1181.36	0.009705	2.45	15.30	42.87	0.72
1	1792.36*	PF 1	37.50	1180.90	1181.25		1181.35	0.011178	2.55	14.69	43.01	0.77
1	1791.36*	PF 1	37.50	1180.89	1181.24		1181.34	0.011116	2.54	14.74	43.27	0.77
1	1790.36*	PF 1	37.50	1180.88	1181.23		1181.33	0.011053	2.53	14.80	43.50	0.77
1	1789.36*	PF 1	37.50	1180.87	1181.22		1181.32	0.010991	2.52	14.86	43.74	0.76
1	1788.36*	PF 1	37.50	1180.86	1181.21		1181.31	0.010899	2.51	14.93	43.99	0.76
1	1787.36*	PF 1	37.50	1180.85	1181.20		1181.29	0.010827	2.50	14.99	44.22	0.76
1	1786.36*	PF 1	37.50	1180.84	1181.19		1181.28	0.010731	2.49	15.06	44.46	0.75
1	1785.36*	PF 1	37.50	1180.83	1181.18		1181.27	0.010607	2.48	15.15	44.71	0.75
1	1784.36*	PF 1	37.50	1180.82	1181.17		1181.26	0.010476	2.46	15.24	44.96	0.75
1	1783.36*	PF 1	37.50	1180.81	1181.16		1181.25	0.010344	2.45	15.33	45.20	0.74
1	1782.36*	PF 1	37.50	1180.80	1181.15		1181.24	0.010195	2.43	15.43	45.45	0.74
1	1781.36*	PF 1	37.50	1180.79	1181.14		1181.23	0.010020	2.41	15.55	45.70	0.73
1	1780.36*	PF 1	37.50	1180.78	1181.13		1181.22	0.009826	2.39	15.67	45.96	0.72
1	1779.36*	PF 1	37.50	1180.77	1181.12		1181.21	0.009629	2.37	15.80	46.20	0.72
1	1778.36*	PF 1	37.50	1180.76	1181.11		1181.20	0.009427	2.35	15.94	46.45	0.71
1	1777.36*	PF 1	37.50	1180.75	1181.10		1181.19	0.009193	2.33	16.09	46.71	0.70
1	1777.34	PF 1	37.50	1180.75	1181.10		1181.19	0.009225	2.33	16.08	46.70	0.70
1	1709.86	PF 1	37.50	1180.06	1180.42		1180.53	0.010668	2.56	14.67	41.44	0.76
1	1708.86*	PF 1	37.50	1180.05	1180.41		1180.51	0.010675	2.55	14.68	41.54	0.76
1	1707.86*	PF 1	37.50	1180.04	1180.40		1180.50	0.010669	2.55	14.70	41.64	0.76
1	1706.86*	PF 1	37.50	1180.03	1180.39		1180.49	0.010688	2.55	14.71	41.73	0.76
1	1705.86*	PF 1	37.50	1180.02	1180.38		1180.48	0.010712	2.55	14.71	41.82	0.76
1	1704.86*	PF 1	37.50	1180.01	1180.37		1180.47	0.010719	2.55	14.72	41.91	0.76
1	1703.86*	PF 1	37.50	1180.00	1180.36		1180.46	0.010726	2.55	14.73	42.01	0.76
1	1702.86*	PF 1	37.50	1179.99	1180.35		1180.45	0.010746	2.55	14.73	42.11	0.76
1	1701.86*	PF 1	37.50	1179.98	1180.34		1180.44	0.010754	2.54	14.74	42.20	0.76
1	1700.86*	PF 1	37.50	1179.97	1180.33		1180.43	0.010763	2.54	14.75	42.30	0.76
1	1699.86*	PF 1	37.50	1179.96	1180.32		1180.42	0.010801	2.54	14.75	42.39	0.76
1	1698.86*	PF 1	37.50	1179.95	1180.31		1180.41	0.010834	2.54	14.75	42.48	0.76
1	1697.86*	PF 1	37.50	1179.94	1180.30		1180.40	0.010868	2.54	14.75	42.58	0.76
1	1696.86*	PF 1	37.50	1179.93	1180.28		1180.39	0.010940	2.55	14.73	42.67	0.76
1	1695.86*	PF 1	37.50	1179.92	1180.27		1180.37	0.011001	2.55	14.72	42.76	0.77
1	1694.86*	PF 1	37.50	1179.91	1180.26		1180.36	0.011088	2.55	14.70	42.85	0.77

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1693.86*	PF 1	37.50	1179.90	1180.25		1180.35	0.011176	2.56	14.68	42.94	0.77
1	1692.86*	PF 1	37.50	1179.89	1180.24		1180.34	0.011312	2.56	14.63	43.02	0.77
1	1691.86*	PF 1	37.50	1179.88	1180.23		1180.33	0.011470	2.57	14.59	43.11	0.78
1	1690.86*	PF 1	37.50	1179.87	1180.22		1180.32	0.011606	2.58	14.55	43.20	0.78
1	1689.86*	PF 1	37.50	1179.85	1180.21		1180.30	0.010519	2.50	15.00	43.36	0.75
1	1688.86*	PF 1	37.50	1179.84	1180.19		1180.29	0.010523	2.50	15.01	43.44	0.75
1	1687.86*	PF 1	37.50	1179.83	1180.18		1180.28	0.010521	2.50	15.03	43.54	0.75
1	1686.86*	PF 1	37.50	1179.82	1180.17		1180.27	0.010500	2.49	15.05	43.63	0.75
1	1685.86*	PF 1	37.50	1179.81	1180.16		1180.26	0.010498	2.49	15.06	43.73	0.75
1	1684.86*	PF 1	37.50	1179.80	1180.15		1180.25	0.010484	2.49	15.08	43.83	0.75
1	1683.86*	PF 1	37.50	1179.79	1180.14		1180.24	0.010459	2.48	15.11	43.93	0.75
1	1682.86*	PF 1	37.50	1179.78	1180.13		1180.23	0.010434	2.48	15.13	44.02	0.75
1	1681.86*	PF 1	37.50	1179.77	1180.12		1180.22	0.010408	2.47	15.16	44.12	0.74
1	1680.86*	PF 1	37.50	1179.76	1180.11		1180.21	0.010384	2.47	15.18	44.22	0.74
1	1679.86*	PF 1	37.50	1179.75	1180.10		1180.20	0.010364	2.47	15.20	44.31	0.74
1	1678.86*	PF 1	37.50	1179.74	1180.09		1180.19	0.010327	2.46	15.23	44.41	0.74
1	1677.86*	PF 1	37.50	1179.73	1180.08		1180.18	0.010291	2.46	15.26	44.51	0.74
1	1676.86*	PF 1	37.50	1179.72	1180.07		1180.17	0.010243	2.45	15.30	44.61	0.74
1	1675.86*	PF 1	37.50	1179.71	1180.06		1180.15	0.010195	2.45	15.33	44.71	0.74
1	1674.86*	PF 1	37.50	1179.70	1180.05		1180.14	0.010136	2.44	15.37	44.81	0.73
1	1673.86*	PF 1	37.50	1179.69	1180.04		1180.13	0.010082	2.43	15.41	44.90	0.73
1	1672.86*	PF 1	37.50	1179.68	1180.03		1180.12	0.010024	2.43	15.45	45.00	0.73
1	1671.86*	PF 1	37.50	1179.67	1180.02		1180.11	0.009954	2.42	15.50	45.10	0.73
1	1670.86*	PF 1	37.50	1179.66	1180.01		1180.10	0.009862	2.41	15.55	45.20	0.72
1	1669.86*	PF 1	37.50	1179.65	1180.00		1180.09	0.009772	2.40	15.61	45.31	0.72
1	1668.86*	PF 1	37.50	1179.64	1179.99		1180.08	0.009660	2.39	15.68	45.41	0.72
1	1667.86*	PF 1	37.50	1179.63	1179.98		1180.07	0.009538	2.38	15.75	45.52	0.71
1	1666.86*	PF 1	37.50	1179.62	1179.98		1180.06	0.009423	2.37	15.82	45.61	0.71
1	1665.86*	PF 1	37.50	1179.61	1179.97		1180.05	0.009294	2.36	15.90	45.72	0.70
1	1664.86*	PF 1	37.50	1179.60	1179.96		1180.04	0.009157	2.35	15.99	45.82	0.70
1	1663.86*	PF 1	37.50	1179.59	1179.95		1180.03	0.009012	2.33	16.08	45.93	0.69
1	1662.86*	PF 1	37.50	1179.58	1179.94		1180.02	0.008860	2.32	16.18	46.04	0.69
1	1661.86*	PF 1	37.50	1179.57	1179.93		1180.01	0.008691	2.30	16.29	46.15	0.68
1	1660.86*	PF 1	37.50	1179.56	1179.92		1180.00	0.008529	2.29	16.39	46.25	0.68
1	1659.86*	PF 1	37.50	1179.55	1179.92		1180.00	0.008340	2.27	16.52	46.36	0.67
1	1658.86*	PF 1	37.50	1179.54	1179.91		1179.99	0.008147	2.25	16.65	46.47	0.66
1	1657.86*	PF 1	37.50	1179.53	1179.90		1179.98	0.007959	2.23	16.79	46.58	0.66
1	1656.86*	PF 1	37.50	1179.52	1179.89		1179.97	0.014386	2.24	16.72	46.67	0.66

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1655.86*	PF 1	37.50	1179.51	1179.87		1179.95	0.015340	2.29	16.40	46.73	0.68
1	1654.86*	PF 1	37.50	1179.50	1179.85		1179.94	0.016832	2.35	15.96	46.76	0.71
1	1653.86*	PF 1	37.50	1179.49	1179.82		1179.92	0.019629	2.46	15.24	46.76	0.76
1	1652.86*	PF 1	37.50	1179.48	1179.77	1179.75800	1179.90	0.029541	2.79	13.46	46.63	0.91
1	1652.33	PF 1	37.50	1179.47	1179.75	1179.74700	1179.88	0.035952	2.96	12.69	46.57	1.00
1	1651.33*	PF 1	37.50	1178.74	1178.86	1179.03500	1179.71	0.661014	7.40	5.07	41.76	3.74
1	1650.33*	PF 1	37.50	1178.01	1178.14	1178.32000	1179.05	0.649743	7.65	4.90	37.92	3.75
1	1649.71	PF 1	37.50	1177.56	1177.70	1177.88400	1178.65	0.639216	7.81	4.80	35.56	3.75
1	1648.71*	PF 1	37.50	1177.55	1177.75	1177.87500	1178.19	0.183411	5.32	7.05	36.39	2.13
1	1647.71*	PF 1	37.50	1177.54	1177.94	1177.86100	1178.04	0.016350	2.53	14.84	38.09	0.71
1	1646.71*	PF 1	37.50	1177.53	1177.92		1178.03	0.017068	2.55	14.71	38.51	0.73
1	1645.71*	PF 1	37.50	1177.52	1177.90		1178.01	0.018185	2.59	14.49	38.91	0.75
1	1644.71*	PF 1	37.50	1177.51	1177.88		1177.99	0.019978	2.65	14.14	39.30	0.78
1	1643.71*	PF 1	37.50	1177.50	1177.86		1177.97	0.021940	2.72	13.81	39.70	0.81
1	1642.71*	PF 1	37.50	1177.49	1177.84		1177.96	0.012741	2.73	13.74	40.14	0.82
1	1641.71*	PF 1	37.50	1177.48	1177.83		1177.94	0.012668	2.71	13.82	40.60	0.82
1	1640.71*	PF 1	37.50	1177.47	1177.82		1177.93	0.012616	2.70	13.90	41.05	0.82
1	1639.71*	PF 1	37.50	1177.46	1177.81		1177.92	0.012539	2.68	13.99	41.51	0.81
1	1638.71*	PF 1	37.50	1177.45	1177.79		1177.90	0.012453	2.66	14.08	41.97	0.81
1	1637.71*	PF 1	37.50	1177.44	1177.78		1177.89	0.012378	2.65	14.16	42.42	0.81
1	1636.71*	PF 1	37.50	1177.43	1177.77		1177.88	0.012301	2.63	14.25	42.88	0.80
1	1635.71*	PF 1	37.50	1177.42	1177.76		1177.87	0.012214	2.61	14.34	43.34	0.80
1	1634.71*	PF 1	37.50	1177.41	1177.75		1177.85	0.012117	2.60	14.44	43.80	0.80
1	1633.71*	PF 1	37.50	1177.40	1177.74		1177.84	0.011996	2.58	14.54	44.27	0.79
1	1632.71*	PF 1	37.50	1177.39	1177.73		1177.83	0.011850	2.56	14.66	44.73	0.79
1	1631.71*	PF 1	37.50	1177.38	1177.71		1177.81	0.011689	2.54	14.78	45.20	0.78
1	1630.71*	PF 1	37.50	1177.37	1177.70		1177.80	0.011525	2.52	14.90	45.67	0.78
1	1629.71*	PF 1	37.50	1177.36	1177.69		1177.79	0.011357	2.50	15.03	46.13	0.77
1	1628.71*	PF 1	37.50	1177.35	1177.68		1177.78	0.011148	2.47	15.17	46.60	0.76
1	1627.71*	PF 1	37.50	1177.34	1177.67		1177.77	0.010904	2.45	15.34	47.07	0.76
1	1626.71*	PF 1	37.50	1177.33	1177.66		1177.75	0.010643	2.42	15.51	47.54	0.75
1	1625.71*	PF 1	37.50	1177.32	1177.65		1177.74	0.010364	2.39	15.70	48.01	0.74
1	1624.71*	PF 1	37.50	1177.31	1177.65		1177.73	0.010070	2.36	15.89	48.49	0.73
1	1623.71*	PF 1	37.50	1177.30	1177.64		1177.72	0.009751	2.33	16.11	48.97	0.72
1	1622.71*	PF 1	37.50	1177.29	1177.63		1177.71	0.009399	2.29	16.35	49.44	0.70
1	1621.71*	PF 1	37.50	1177.28	1177.62		1177.70	0.009044	2.26	16.61	49.92	0.69
1	1620.71*	PF 1	37.50	1177.27	1177.61		1177.69	0.008667	2.22	16.89	50.41	0.68
1	1619.71*	PF 1	37.50	1177.26	1177.60		1177.68	0.008292	2.18	17.18	50.90	0.66

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1618.71*	PF 1	37.50	1177.25	1177.60		1177.67	0.007909	2.14	17.49	51.38	0.65
1	1617.71*	PF 1	37.50	1177.24	1177.59		1177.66	0.007511	2.10	17.83	51.87	0.63
1	1616.71*	PF 1	37.50	1177.23	1177.58		1177.65	0.007120	2.06	18.19	52.37	0.62
1	1615.71*	PF 1	37.50	1177.22	1177.58		1177.64	0.006730	2.02	18.57	52.86	0.60
1	1614.71*	PF 1	37.50	1177.21	1177.57		1177.63	0.006347	1.98	18.97	53.35	0.58
1	1613.71*	PF 1	37.50	1177.20	1177.57		1177.63	0.005966	1.93	19.39	53.84	0.57
1	1612.71*	PF 1	37.50	1177.19	1177.56		1177.62	0.005601	1.89	19.84	54.35	0.55
1	1611.71*	PF 1	37.50	1177.18	1177.56		1177.61	0.005250	1.85	20.30	54.85	0.54
1	1610.71*	PF 1	37.50	1177.17	1177.55		1177.61	0.004878	1.80	20.83	55.36	0.52
1	1609.71*	PF 1	37.50	1177.16	1177.55		1177.60	0.004524	1.75	21.38	55.86	0.50
1	1608.71*	PF 1	37.50	1177.15	1177.55		1177.59	0.004190	1.71	21.96	56.38	0.48
1	1607.71*	PF 1	37.50	1177.14	1177.55		1177.59	0.003878	1.66	22.56	56.90	0.47
1	1606.71*	PF 1	37.50	1177.13	1177.54		1177.58	0.003585	1.62	23.18	57.41	0.45
1	1605.71*	PF 1	37.50	1177.12	1177.54		1177.58	0.003313	1.57	23.82	57.92	0.43
1	1604.71*	PF 1	37.50	1177.11	1177.54		1177.58	0.003064	1.53	24.47	58.44	0.42
1	1603.71*	PF 1	37.50	1177.10	1177.54		1177.57	0.002828	1.49	25.16	58.96	0.40
1	1602.71*	PF 1	37.50	1177.09	1177.54		1177.57	0.002612	1.45	25.86	59.48	0.39
1	1602.35	PF 1	37.50	1177.09	1177.53		1177.57	0.002613	1.45	25.88	59.64	0.39
1	1601.35*	PF 1	37.50	1177.08	1177.53		1177.56	0.002468	1.42	26.32	59.59	0.38
1	1600.35*	PF 1	37.50	1177.07	1177.53		1177.56	0.002334	1.40	26.75	59.53	0.37
1	1599.35*	PF 1	37.50	1177.06	1177.53		1177.56	0.002210	1.38	27.19	59.47	0.36
1	1598.35*	PF 1	37.50	1177.05	1177.53		1177.56	0.002089	1.36	27.64	59.44	0.35
1	1597.35*	PF 1	37.50	1177.04	1177.53		1177.55	0.001978	1.34	28.09	59.39	0.34
1	1596.35*	PF 1	37.50	1177.03	1177.52		1177.55	0.001875	1.31	28.53	59.32	0.33
1	1595.35*	PF 1	37.50	1177.02	1177.52		1177.55	0.001776	1.29	28.99	59.26	0.33
1	1594.35*	PF 1	37.50	1177.01	1177.52		1177.55	0.001685	1.27	29.44	59.20	0.32
1	1593.35*	PF 1	37.50	1177.00	1177.52		1177.54	0.001597	1.25	29.91	59.14	0.31
1	1592.35*	PF 1	37.50	1176.99	1177.52		1177.54	0.001515	1.23	30.37	59.08	0.30
1	1591.35*	PF 1	37.50	1176.98	1177.52		1177.54	0.001438	1.22	30.84	59.04	0.30
1	1590.35*	PF 1	37.50	1176.97	1177.52		1177.54	0.001366	1.20	31.31	58.98	0.29
1	1589.35*	PF 1	37.50	1176.96	1177.52		1177.54	0.001298	1.18	31.77	58.90	0.28
1	1588.35*	PF 1	37.50	1176.95	1177.52		1177.54	0.001235	1.16	32.24	58.83	0.28
1	1587.35*	PF 1	37.50	1176.94	1177.51		1177.54	0.001174	1.15	32.72	58.77	0.27
1	1586.35*	PF 1	37.50	1176.93	1177.51		1177.53	0.001119	1.13	33.18	58.69	0.27
1	1585.35*	PF 1	37.50	1176.92	1177.51		1177.53	0.001066	1.11	33.65	58.62	0.26
1	1584.35*	PF 1	37.50	1176.91	1177.51		1177.53	0.001016	1.10	34.12	58.54	0.25
1	1583.35*	PF 1	37.50	1176.90	1177.51		1177.53	0.000969	1.08	34.60	58.50	0.25
1	1582.35*	PF 1	37.50	1176.89	1177.51		1177.53	0.000925	1.07	35.06	58.41	0.24

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1581.35*	PF 1	37.50	1176.88	1177.51		1177.53	0.000883	1.06	35.54	58.34	0.24
1	1580.35*	PF 1	37.50	1176.87	1177.51		1177.53	0.000843	1.04	36.01	58.25	0.23
1	1579.35*	PF 1	37.50	1176.86	1177.51		1177.53	0.000806	1.03	36.48	58.17	0.23
1	1578.35*	PF 1	37.50	1176.85	1177.51		1177.52	0.000771	1.01	36.96	58.11	0.22
1	1577.35*	PF 1	37.50	1176.84	1177.51		1177.52	0.000738	1.00	37.43	58.05	0.22
1	1576.35*	PF 1	37.50	1176.83	1177.51		1177.52	0.000707	0.99	37.91	58.01	0.22
1	1575.35*	PF 1	37.50	1176.82	1177.51		1177.52	0.000678	0.98	38.38	57.95	0.21
1	1574.35*	PF 1	37.50	1176.81	1177.51		1177.52	0.000650	0.97	38.84	57.88	0.21
1	1573.35*	PF 1	37.50	1176.80	1177.51		1177.52	0.000624	0.95	39.31	57.82	0.20
1	1572.35*	PF 1	37.50	1176.79	1177.51		1177.52	0.000598	0.94	39.79	57.76	0.20
1	1571.35*	PF 1	37.50	1176.78	1177.51		1177.52	0.000575	0.93	40.26	57.69	0.20
1	1570.35*	PF 1	37.50	1176.77	1177.51		1177.52	0.000552	0.92	40.73	57.63	0.19
1	1569.35*	PF 1	37.50	1176.76	1177.51		1177.52	0.000530	0.91	41.22	57.60	0.19
1	1568.35*	PF 1	37.50	1176.75	1177.50		1177.52	0.000510	0.90	41.68	57.53	0.19
1	1567.35*	PF 1	37.50	1176.74	1177.50		1177.52	0.000491	0.89	42.14	57.47	0.18
1	1566.35*	PF 1	37.50	1176.73	1177.50		1177.52	0.000473	0.88	42.61	57.41	0.18
1	1565.35*	PF 1	37.50	1176.72	1177.50		1177.52	0.000455	0.87	43.08	57.35	0.18
1	1564.35*	PF 1	37.50	1176.71	1177.50		1177.52	0.000438	0.86	43.54	57.28	0.17
1	1563.35*	PF 1	37.50	1176.70	1177.50		1177.51	0.000423	0.85	44.00	57.22	0.17
1	1562.35*	PF 1	37.50	1176.69	1177.50		1177.51	0.000408	0.84	44.47	57.18	0.17
1	1561.35*	PF 1	37.50	1176.68	1177.50		1177.51	0.000394	0.83	44.92	57.12	0.17
1	1560.35*	PF 1	37.50	1176.67	1177.50		1177.51	0.000380	0.83	45.38	57.05	0.16
1	1559.35*	PF 1	37.50	1176.66	1177.50		1177.51	0.000367	0.82	45.84	56.99	0.16
1	1558.35*	PF 1	37.50	1176.65	1177.50		1177.51	0.000355	0.81	46.29	56.93	0.16
1	1557.35*	PF 1	37.50	1176.64	1177.50		1177.51	0.000343	0.80	46.74	56.87	0.16
1	1556.35*	PF 1	37.50	1176.63	1177.50		1177.51	0.000331	0.79	47.21	56.82	0.15
1	1555.35*	PF 1	37.50	1176.62	1177.50		1177.51	0.000321	0.79	47.67	56.77	0.15
1	1554.35*	PF 1	37.50	1176.61	1177.50		1177.51	0.000310	0.78	48.12	56.71	0.15
1	1553.35*	PF 1	37.50	1176.60	1177.50		1177.51	0.000300	0.77	48.57	56.65	0.15
1	1552.35*	PF 1	37.50	1176.59	1177.50		1177.51	0.000291	0.76	49.02	56.59	0.14
1	1551.35*	PF 1	37.50	1176.58	1177.50		1177.51	0.000282	0.76	49.46	56.53	0.14
1	1550.35*	PF 1	37.50	1176.57	1177.50		1177.51	0.000273	0.75	49.91	56.47	0.14
1	1549.35*	PF 1	37.50	1176.56	1177.50		1177.51	0.000265	0.74	50.34	56.41	0.14
1	1548.35*	PF 1	37.50	1176.55	1177.50		1177.51	0.000257	0.74	50.79	56.34	0.14
1	1547.35*	PF 1	37.50	1176.54	1177.50		1177.51	0.000249	0.73	51.25	56.31	0.14
1	1546.35*	PF 1	37.50	1176.53	1177.50		1177.51	0.000242	0.73	51.69	56.24	0.13
1	1545.35*	PF 1	37.50	1176.52	1177.50		1177.51	0.000235	0.72	52.12	56.18	0.13
1	1544.35*	PF 1	37.50	1176.51	1177.50		1177.51	0.000228	0.71	52.57	56.13	0.13

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1543.35*	PF 1	37.50	1176.50	1177.50		1177.51	0.000222	0.71	53.00	56.06	0.13
1	1542.35*	PF 1	37.50	1176.49	1177.50		1177.51	0.000215	0.70	53.44	56.00	0.13
1	1541.35*	PF 1	37.50	1176.48	1177.50		1177.51	0.000209	0.70	53.87	55.94	0.13
1	1540.35*	PF 1	37.50	1176.47	1177.50		1177.51	0.000204	0.69	54.31	55.90	0.12
1	1539.35*	PF 1	37.50	1176.46	1177.50		1177.51	0.000198	0.69	54.73	55.84	0.12
1	1538.35*	PF 1	37.50	1176.45	1177.50		1177.51	0.000193	0.68	55.16	55.78	0.12
1	1537.35*	PF 1	37.50	1176.44	1177.50		1177.51	0.000188	0.67	55.59	55.71	0.12
1	1536.35*	PF 1	37.50	1176.43	1177.50		1177.51	0.000183	0.67	56.01	55.65	0.12
1	1535.35*	PF 1	37.50	1176.42	1177.50		1177.51	0.000178	0.66	56.43	55.59	0.12
1	1534.35*	PF 1	37.50	1176.41	1177.50		1177.50	0.000173	0.66	56.86	55.54	0.11
1	1533.35*	PF 1	37.50	1176.40	1177.50		1177.50	0.000169	0.65	57.28	55.50	0.11
1	1532.35*	PF 1	37.50	1176.39	1177.50		1177.50	0.000165	0.65	57.69	55.43	0.11
1	1531.35*	PF 1	37.50	1176.38	1177.50		1177.50	0.000161	0.65	58.12	55.38	0.11
1	1530.35*	PF 1	37.50	1176.37	1177.50		1177.50	0.000157	0.64	58.52	55.31	0.11
1	1529.35*	PF 1	37.50	1176.36	1177.50		1177.50	0.000153	0.64	58.93	55.25	0.11
1	1528.35*	PF 1	37.50	1176.35	1177.50		1177.50	0.000149	0.63	59.36	55.20	0.11
1	1527.35*	PF 1	37.50	1176.34	1177.50		1177.50	0.000259	0.63	59.77	55.13	0.11
1	1526.35*	PF 1	37.50	1176.33	1177.50		1177.50	0.000252	0.62	60.18	55.09	0.11
1	1525.35*	PF 1	37.50	1176.32	1177.50		1177.50	0.000246	0.62	60.59	55.03	0.10
1	1524.35*	PF 1	37.50	1176.31	1177.50		1177.50	0.000241	0.61	60.98	54.97	0.10
1	1523.35*	PF 1	37.50	1176.30	1177.50		1177.50	0.000235	0.61	61.37	54.91	0.10
1	1522.84	PF 1	37.50	1176.29	1177.50		1177.50	0.000229	0.61	61.84	54.90	0.10
1	1521.84*	PF 1	37.50	1175.54	1177.50		1177.50	0.000048	0.37	100.36	57.12	0.05
1	1520.84*	PF 1	37.50	1174.79	1177.50		1177.50	0.000021	0.26	143.24	74.90	0.03
1	1520.83	PF 1	37.50	1174.79	1177.50		1177.50	0.000021	0.26	143.20	74.89	0.03
1	1519.83*	PF 1	37.50	1174.78	1177.50		1177.50	0.000021	0.26	143.75	75.27	0.03
1	1518.83*	PF 1	37.50	1174.77	1177.50		1177.50	0.000021	0.26	144.50	75.69	0.03
1	1517.83*	PF 1	37.50	1174.76	1177.50		1177.50	0.000021	0.26	145.06	76.08	0.03
1	1516.83*	PF 1	37.50	1174.75	1177.50		1177.50	0.000021	0.26	145.85	76.51	0.03
1	1515.83*	PF 1	37.50	1174.74	1177.50		1177.50	0.000020	0.26	146.40	76.90	0.03
1	1514.83*	PF 1	37.50	1174.73	1177.50		1177.50	0.000020	0.25	147.14	77.31	0.03
1	1513.83*	PF 1	37.50	1174.72	1177.50		1177.50	0.000008	0.25	148.21	61.66	0.03
1	1512.83*	PF 1	37.50	1174.71	1177.50		1177.50	0.000008	0.25	149.61	62.01	0.03
1	1511.83*	PF 1	37.50	1174.70	1177.50		1177.50	0.000008	0.25	150.98	62.32	0.03
1	1510.83*	PF 1	37.50	1174.69	1177.50		1177.50	0.000008	0.25	152.39	62.68	0.03
1	1509.83*	PF 1	37.50	1174.68	1177.50		1177.50	0.000008	0.24	153.76	63.00	0.03
1	1508.83*	PF 1	37.50	1174.67	1177.50		1177.50	0.000007	0.24	155.16	63.31	0.03
1	1507.83*	PF 1	37.50	1174.66	1177.50		1177.50	0.000007	0.24	156.61	63.67	0.03

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1506.83*	PF 1	37.50	1174.65	1177.50		1177.50	0.000007	0.24	157.99	63.99	0.03
1	1505.83*	PF 1	37.50	1174.64	1177.50		1177.50	0.000007	0.24	159.45	64.35	0.03
1	1504.83*	PF 1	37.50	1174.63	1177.50		1177.50	0.000007	0.23	160.87	64.66	0.03
1	1503.83*	PF 1	37.50	1174.62	1177.50		1177.50	0.000007	0.23	162.33	65.02	0.03
1	1502.83*	PF 1	37.50	1174.61	1177.50		1177.50	0.000006	0.23	163.75	65.34	0.03
1	1501.83*	PF 1	37.50	1174.60	1177.50		1177.50	0.000006	0.23	165.22	65.68	0.03
1	1500.83*	PF 1	37.50	1174.59	1177.50		1177.50	0.000006	0.22	166.68	66.02	0.02
1	1499.83*	PF 1	37.50	1174.58	1177.50		1177.50	0.000006	0.22	168.16	66.36	0.02
1	1498.83*	PF 1	37.50	1174.57	1177.50		1177.50	0.000006	0.22	169.57	66.67	0.02
1	1497.83*	PF 1	37.50	1174.56	1177.50		1177.50	0.000006	0.22	171.06	67.01	0.02
1	1496.83*	PF 1	37.50	1174.55	1177.50		1177.50	0.000006	0.22	172.55	67.35	0.02
1	1495.83*	PF 1	37.50	1174.54	1177.50		1177.50	0.000005	0.22	173.99	67.66	0.02
1	1494.83*	PF 1	37.50	1174.53	1177.50		1177.50	0.000005	0.21	175.53	68.03	0.02
1	1493.83*	PF 1	37.50	1174.52	1177.50		1177.50	0.000005	0.21	177.01	68.35	0.02
1	1492.83*	PF 1	37.50	1174.51	1177.50		1177.50	0.000005	0.21	178.52	68.69	0.02
1	1491.83*	PF 1	37.50	1174.50	1177.50		1177.50	0.000005	0.21	180.03	69.02	0.02
1	1490.83*	PF 1	37.50	1174.49	1177.50		1177.50	0.000005	0.21	181.57	69.36	0.02
1	1489.83*	PF 1	37.50	1174.48	1177.50		1177.50	0.000005	0.20	183.08	69.69	0.02
1	1488.83*	PF 1	37.50	1174.46	1177.50		1177.50	0.000005	0.20	185.29	70.07	0.02
1	1487.83*	PF 1	37.50	1174.45	1177.50		1177.50	0.000005	0.20	186.78	70.38	0.02
1	1486.83*	PF 1	37.50	1174.44	1177.50		1177.50	0.000004	0.20	188.35	70.73	0.02
1	1485.83*	PF 1	37.50	1174.43	1177.50		1177.50	0.000004	0.20	189.89	71.06	0.02
1	1484.83*	PF 1	37.50	1174.42	1177.50		1177.50	0.000004	0.20	191.43	71.38	0.02
1	1483.83*	PF 1	37.50	1174.41	1177.50		1177.50	0.000004	0.19	192.99	71.72	0.02
1	1482.83*	PF 1	37.50	1174.40	1177.50		1177.50	0.000004	0.19	194.56	72.05	0.02
1	1481.83*	PF 1	37.50	1174.39	1177.50		1177.50	0.000004	0.19	196.17	72.40	0.02
1	1480.83*	PF 1	37.50	1174.38	1177.50		1177.50	0.000004	0.19	197.72	72.72	0.02
1	1479.83*	PF 1	37.50	1174.37	1177.50		1177.50	0.000004	0.19	199.31	73.07	0.02
1	1478.83*	PF 1	37.50	1174.36	1177.50		1177.50	0.000004	0.19	200.92	73.40	0.02
1	1477.83*	PF 1	37.50	1174.35	1177.50		1177.50	0.000004	0.19	202.52	73.74	0.02
1	1476.83*	PF 1	37.50	1174.34	1177.50		1177.50	0.000004	0.18	204.12	74.07	0.02
1	1475.83*	PF 1	37.50	1174.33	1177.50		1177.50	0.000004	0.18	205.75	74.41	0.02
1	1474.83*	PF 1	37.50	1174.32	1177.50		1177.50	0.000003	0.18	207.33	74.73	0.02
1	1473.83*	PF 1	37.50	1174.31	1177.50		1177.50	0.000003	0.18	208.97	75.08	0.02
1	1472.83*	PF 1	37.50	1174.30	1177.50		1177.50	0.000003	0.18	210.59	75.41	0.02
1	1471.83*	PF 1	37.50	1174.29	1177.50		1177.50	0.000003	0.18	212.19	75.72	0.02
1	1470.83*	PF 1	37.50	1174.28	1177.50		1177.50	0.000003	0.18	213.89	76.09	0.02
1	1469.83*	PF 1	37.50	1174.27	1177.50		1177.50	0.000003	0.17	215.53	76.41	0.02

Plan 04 - Proposed Invert Slope (WSE Downstream Boundary Condition)

HEC-RAS Plan: Plan 04 River: Entrada Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	1468.83*	PF 1	37.50	1174.26	1177.50		1177.50	0.000003	0.17	217.15	76.74	0.02
1	1467.83*	PF 1	37.50	1174.25	1177.50		1177.50	0.000003	0.17	218.84	77.08	0.02
1	1466.83*	PF 1	37.50	1174.24	1177.50		1177.50	0.000003	0.17	220.52	77.42	0.02
1	1465.83*	PF 1	37.50	1174.23	1177.50		1177.50	0.000003	0.17	222.18	77.75	0.02
1	1464.83*	PF 1	37.50	1174.22	1177.50		1177.50	0.000003	0.17	223.86	78.10	0.02
1	1463.83*	PF 1	37.50	1174.21	1177.50		1177.50	0.000003	0.17	225.54	78.42	0.02
1	1462.83*	PF 1	37.50	1174.20	1177.50		1177.50	0.000003	0.17	227.22	78.75	0.02
1	1461.83*	PF 1	37.50	1174.19	1177.50		1177.50	0.000003	0.16	228.95	79.09	0.02
1	1460.83*	PF 1	37.50	1174.18	1177.50		1177.50	0.000003	0.16	230.58	79.41	0.02
1	1459.83*	PF 1	37.50	1174.17	1177.50		1177.50	0.000003	0.16	232.33	79.76	0.02
1	1458.83*	PF 1	37.50	1174.16	1177.50		1177.50	0.000003	0.16	234.05	80.09	0.02
1	1457.83*	PF 1	37.50	1174.15	1177.50		1177.50	0.000003	0.16	235.79	80.44	0.02
1	1456.83*	PF 1	37.50	1174.14	1177.50		1177.50	0.000002	0.16	237.48	80.75	0.02
1	1455.83*	PF 1	37.50	1174.13	1177.50		1177.50	0.000002	0.16	239.24	81.10	0.02
1	1454.83*	PF 1	37.50	1174.12	1177.50		1177.50	0.000002	0.16	240.97	81.44	0.02
1	1453.83*	PF 1	37.50	1174.11	1177.50		1177.50	0.000002	0.15	242.73	81.77	0.02
1	1452.83*	PF 1	37.50	1174.10	1177.50		1177.50	0.000002	0.15	244.45	82.09	0.02
1	1451.83*	PF 1	37.50	1174.09	1177.50		1177.50	0.000002	0.15	246.24	82.45	0.02
1	1450.83*	PF 1	37.50	1174.08	1177.50		1177.50	0.000002	0.15	247.98	82.76	0.02
1	1449.83*	PF 1	37.50	1174.07	1177.50		1177.50	0.000002	0.15	249.78	83.11	0.02
1	1448.83*	PF 1	37.50	1174.06	1177.50		1177.50	0.000002	0.15	251.52	83.44	0.02
1	1447.98	PF 1	37.50	1174.05	1177.50	1174.27200	1177.50	0.000002	0.15	253.16	83.73	0.02

2 – Equilibrium Slope Calculations

EX No Self-Form						
Reach	AMAFCA					
	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
1	0.0090	0.0104	0.0120	0.0136	0.0154	0.0192
2	0.0098	0.0113	0.0130	0.0148	0.0167	0.0209
3	0.0089	0.0103	0.0118	0.0134	0.0152	0.0190

Reach	HEC-20 Eq. 6.17	Reach	HEC-20 Eq. 6.18
1	0.0227	1	0.0047
2	0.0509	2	0.0106
3	0.0345	3	0.0072

EX Self-Form						
Reach	AMAFCA					
	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
1	0.0093	0.0107	0.0123	0.0140	0.0159	0.0198
2	0.0093	0.0108	0.0124	0.0141	0.0159	0.0199
3	0.0098	0.0114	0.0130	0.0148	0.0168	0.0210

Reach	HEC-20 Eq. 6.17	Reach	HEC-20 Eq. 6.18
1	0.0360	1	0.0075
2	0.0366	2	0.0077
3	0.0456	3	0.0095

Proposed - DS ND						
Reach	AMAFCA					
	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
1	0.0095	0.011	0.0127	0.0144	0.0163	0.0204
2	0.0115	0.013	0.0153	0.0174	0.0197	0.0246
3	0.0101	0.012	0.0135	0.0154	0.0173	0.0217

Reach	HEC-20 Eq. 6.17	Reach	HEC-20 Eq. 6.18
1	0.046	1	0.010
2	0.075	2	0.016
3	0.034	3	0.007

Avg AMAFCA	Avg 6.17	Avg 6.18
0.012	0.052	0.011

Proposed - DS WSE						
Reach	AMAFCA					
	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
1	0.0093	0.011	0.0124	0.0141	0.0159	0.0199
2	0.0115	0.013	0.0153	0.0174	0.0197	0.0246
3	0.0101	0.012	0.0135	0.0154	0.0173	0.0217

Reach	HEC-20 Eq. 6.17	Reach	HEC-20 Eq. 6.18
1	0.047	1	0.010
2	0.075	2	0.016
3	0.034	3	0.007

Avg AMAFCA	Avg 6.17	Avg 6.18
0.012	0.052	0.011

Existing Conditions																		
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Max Chl Dpth	Wetted Perim	Hydraulic Radius	q	W/D Ratio	Length Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)	(ft^2/ft)	cfs/ft		(ft)
1	3895.84	PF 1	21.7	1230.93	1233.02	1231.56	1233.03	0.000139	0.73	29.59	20.41	0.11	2.09	21.06	1.41	1.06	9.77	45.23
1	3850.61	PF 1	21.7	1232.17	1232.89		1233	0.01153	2.7	8.05	22.07	0.79	0.71	22.28	0.36	0.98	31.08	44.36
1	3806.24	PF 1	21.7	1231.73	1232.45		1232.54	0.008672	2.4	9.03	23.68	0.69	0.72	23.98	0.38	0.92	32.89	41.16
1	3765.08	PF 1	21.7	1231.32	1231.87	1231.87	1232.02	0.019893	3.08	7.04	23.72	1	0.55	24.01	0.29	0.91	43.13	51.85
1	3713.23	PF 1	21.7	1229.97	1230.72	1230.74	1230.95	0.020959	3.89	5.58	13.88	1.08	0.75	14	0.40	1.56	18.51	58.96
1	3654.26	PF 1	21.7	1226.59	1226.73	1226.9	1227.6	0.375783	7.57	2.91	23.94	3.78	0.14	23.99	0.12	0.91	171.00	5.63
1	3648.64	PF 1	21.7	1226.5	1226.88	1226.82	1226.98	0.010768	2.43	8.88	26.98	0.75	0.38	27.12	0.33	0.80	71.00	43.22
1	3605.41	PF 1	21.7	1225.91	1226.21	1226.19	1226.28	0.015634	2.2	9.86	46.51	0.84	0.3	46.54	0.21	0.47	155.03	68.33
1	3537.09	PF 1	21.7	1224.36	1224.9	1224.9	1225.03	0.02174	2.93	7.41	28.73	1.02	0.54	29.18	0.25	0.76	53.20	5.91
1	3531.18	PF 1	21.7	1224.13	1224.6	1224.68	1224.85	0.045971	4	5.43	23.11	1.45	0.47	23.5	0.23	0.94	49.17	90.55
1	3440.63	PF 1	33.8	1221.99	1222.4	1222.4	1222.51	0.021709	2.69	12.58	55.96	1	0.41	56.3	0.22	0.60	136.49	74.11
1	3366.51	PF 1	33.8	1219.32	1219.82	1219.92	1220.14	0.050709	4.5	7.51	29.04	1.56	0.5	29.31	0.26	1.16	58.08	60.74
1	3305.78	PF 1	33.8	1216.49	1217.07	1217.16	1217.39	0.040625	4.54	7.44	24.21	1.44	0.58	24.28	0.31	1.40	41.74	52.46
1	3253.32	PF 1	33.8	1214.98	1215.31	1215.34	1215.45	0.031966	2.95	11.47	59.68	1.19	0.33	59.7	0.19	0.57	180.85	3.15
1	3250.17	PF 1	33.8	1214.88	1215.17	1215.21	1215.33	0.042856	3.15	10.72	62.79	1.35	0.29	62.8	0.17	0.54	216.52	63.99
1	3186.18	PF 1	33.8	1213.19	1213.54	1213.54	1213.65	0.021369	2.66	12.7	56.92	0.99	0.35	56.94	0.22	0.59	162.63	94.35
1	3091.83	PF 1	33.8	1210.75	1211.03	1211.07	1211.23	0.030997	3.58	9.43	35.53	1.23	0.28	35.79	0.26	0.95	126.89	61.46
1	3030.37	PF 1	33.8	1209	1209.45	1209.45	1209.56	0.023533	2.66	12.72	61.16	1.03	0.45	61.51	0.21	0.55	135.91	26.04
1	3004.33	PF 1	33.8	1208.51	1208.89	1208.89	1209	0.019621	2.69	12.55	51.51	0.96	0.38	51.85	0.24	0.66	135.55	5.91
1	2998.41	PF 1	33.8	1208.37	1208.72	1208.74	1208.86	0.030946	3.05	11.07	53.02	1.18	0.35	53.33	0.21	0.64	151.49	43.01
1	2955.4	PF 1	33.8	1207.24	1207.68	1207.68	1207.79	0.0239	2.61	12.96	64.82	1.03	0.44	65.2	0.20	0.52	147.32	40.75
1	2914.65	PF 1	33.8	1206.45	1206.74	1206.78	1206.88	0.044802	2.99	11.29	73.74	1.35	0.29	74.01	0.15	0.46	254.28	99.06
1	2815.59	PF 1	33.8	1204.13	1204.48	1204.48	1204.56	0.024134	2.24	15.1	96.03	1	0.35	96.24	0.16	0.35	274.37	33.00
1	2782.59	PF 1	33.8	1203	1203.33	1203.39	1203.59	0.034316	4.09	8.25	27.61	1.32	0.33	27.69	0.30	1.22	83.67	39.02
1	2743.58	PF 1	33.8	1202.49	1202.82	1202.82	1202.89	0.022335	2.02	16.73	117.19	0.94	0.33	117.42	0.14	0.29	355.12	38.63
1	2704.94	PF 1	33.8	1201.05	1201.81	1201.81	1201.91	0.028004	2.57	13.16	75.83	1.09	0.76	76.27	0.17	0.45	99.78	4.40
1	2700.54	PF 1	33.8	1201.55	1201.65	1201.7	1201.81	0.016812	0.84	11.46	59.3	0.68	0.65	59.58	0.19	0.57	91.23	39.50
1	2661.04	PF 1	33.8	1200.7	1200.87	1200.96	1201.17	0.151758	4.41	7.68	71.15	2.35	0.17	71.26	0.11	0.48	418.53	44.34
1	2616.7	PF 1	33.8	1199.67	1200.04	1200.03	1200.08	0.018473	1.71	20.26	172.82	0.84	0.37	173.04	0.12	0.20	467.08	76.03
1	2540.68	PF 1	33.8	1198.01	1198.39	1198.39	1198.45	0.025275	1.97	17.17	136.97	0.98	0.38	137.27	0.13	0.25	360.45	58.97
1	2481.7	PF 1	33.8	1196.68	1197.06	1197.09	1197.17	0.016217	1.76	15.58	89.63	0.81	0.5	90.01	0.17	0.38	179.26	72.38
1	2409.33	PF 1	33.8	1195.25	1195.44	1195.48	1195.61	0.040402	1.6	14.05	164.52	1.11	0.34	164.82	0.09	0.21	483.88	88.97
1	2320.35	PF 1	37.5	1193	1193.14	1193.14	1193.21	0.02591	2.09	17.91	133.09	1.01	0.14	133.1	0.13	0.28	950.64	200.44
1	2119.93	PF 1	37.5	1187	1187.41	1187.47	1187.68	0.029161	4.23	8.87	25.05	1.25	0.41	25.13	0.35	1.50	61.10	51.36
1	2068.55	PF 1	37.5	1186	1186.28	1186.38	1186.61	0.048602	4.59	8.17	29.88	1.55	0.28	29.96	0.27	1.26	106.71	68.48
1	2000.07	PF 1	37.5	1184	1185.26	1185.1	1185.5	0.008248	3.88	9.66	11.55	0.75	1.26	12.06	0.80	3.25	9.17	56.42
1	1943.65	PF 1	37.5	1183.66	1184.64	1184.64	1184.91	0.012921	4.28	9.43	18.96	0.91	0.98	19.3	0.49	1.98	19.35	81.17
1	1862.48	PF 1	37.5	1181.99	1182.47	1182.64	1183.03	0.049864	6.04	6.21	15.25	1.67	0.48	15.37	0.40	2.46	31.77	51.42
1	1811.06	PF 1	37.5	1180.69	1181.46	1181.46	1181.78	0.015965	4.55	8.24	12.98	1.01	0.77	13.3	0.62	2.89	16.86	3.7
1	1807.36	PF 1	37.5	1180.46	1181.06	1181.23	1181.66	0.044835	6.2	6.05	13.06	1.61	0.6	13.3	0.45	2.87	21.77	30.02
1	1777.34	PF 1	37.5	1180	1180.49	1180.56	1180.78	0.032395	4.33	8.65	25.25	1.3	0.49	25.54	0.34	1.49	51.53	67.48
1	1709.86	PF 1	37.5	1178.12	1178.68	1178.76	1178.94	0.046848	5.95	9.57	45.92	1.57	0.56	46.12	0.21	0.82	82.00	57.53
1	1652.33	PF 1	37.5	1177	1177.48	1177.44	1177.62	0.012515	3.06	12.66	33.45	0.84	0.48	33.75	0.38	1.12	69.69	2.62
1	1649.71	PF 1	37.5	1177	1177.47		1177.58	0.010123	2.7	13.95	35.38	0.75	0.47	35.81	0.39	1.06	75.28	47.36
1	1602.35	PF 1	37.5	1176.22	1176.71	1176.71	1176.89	0.018826	3.32	11.11	30.98	1	0.73	31.8	0.35	1.21	42.44	79.51
1	1522.84	PF 1	37.5	1174.86	1175.22	1175.22	1175.36	0.018767	3.09	12.67	46.01	0.98	0.36	46.32	0.27	0.82	127.81	2.01
1	1520.83	PF 1	37.5	1174.81	1175.13	1175.17	1175.31	0.027073	3.47	11.18	45.02	1.16	0.32	45.22	0.25	0.83	140.69	72.85
1	1447.98	PF 1	37.5	1172.71	1173.18	1173.2	1173.31	0.027521	2.84	13.36	68	1.11	0.47	68.25	0.20	0.55	144.68	

Parameter	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Discharge (cfs)	37.5	33.8	21.7
Average Hydr Radius (ft)	0.37	0.19	0.40
Average Width (ft)	36.86	74.52	25.30
Average Discharge Per Unit Width, q (cfs/ft)	1.52	0.59	0.93
Average Energy Slope, S (dimensionless)	0.0268	0.0346	0.0531
Average Froude Number, Fr (dimensionless)	1.154	1.156	1.151
Average Manning n-value	0.030	0.030	0.030
Average Velocity (fps)	4.039	2.785	3.193
Average Depth (ft)	0.550	0.401	0.665
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.1126	0.1126	0.1126
Temperature (˚F)	60	60	60
Kinematic viscosity of water, v (ft^2/s)	0.00001217	0.00001217	0.00001217
Unit Weight of Water, γ_w (lb/ft^3)	62.4	62.4	62.4
Specific Weight of Sediment, γ_s (lb/ft^3)	165.4	165.4	165.4

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Equation 3.59

$$S_{eq} = CQ^{-0.133}$$

$$C = 18.28 n^2 F^{0.133} F_r^{2.133}$$

F = width/depth ratio typicall about 40 (Leopold and Miller, 1956; Harvey, 1985)

	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
Reach 1						
Flowrate, Q (cfs)	37.5	37.5	37.5	37.5	37.5	37.5
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	121.97	121.97	121.97	121.97	121.97	121.97
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0146	0.0169	0.0194	0.0220	0.0249	0.0312
Equilibrium Slope, S_{eq} (ft/ft)	**0.0090**	**0.0104**	**0.0120**	**0.0136**	**0.0154**	**0.0192**
Reach 2						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	33.8	33.8	33.8	33.8	33.8	33.8
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	207.32	207.32	207.32	207.32	207.32	207.32
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0156	0.0181	0.0208	0.0236	0.0267	0.0334
Equilibrium Slope, S_{eq} (ft/ft)	**0.0098**	**0.0113**	**0.0130**	**0.0148**	**0.0167**	**0.0209**
Reach 3						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	21.7	21.7	21.7	21.7	21.7	21.7
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	63.48	63.48	63.48	63.48	63.48	63.48
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0134	0.0155	0.0178	0.0202	0.0228	0.0286
Equilibrium Slope, S_{eq} (ft/ft)	**0.0089**	**0.0103**	**0.0118**	**0.0134**	**0.0152**	**0.0190**
Avg. Across All Reaches =	**0.0092**	**0.0107**	**0.0123**	**0.0139**	**0.0158**	**0.0197**

HEC-20 Equation 6.17

$$S_{eq} = \left[K_s D_c \left(\frac{\gamma_s - \gamma}{\gamma} \right) \right]^{\frac{10}{7}} \left(\frac{1.486}{qn} \right)^{\frac{6}{7}}$$

$D_C = D_{90}$

	Reach 1 STA 1447.98 to STA 2320.35	**Reach 2 STA 2409.33 to STA 3440.63**	**Reach 3 STA 3531.18 to STA 3895.84**
Original stream energy slope, S (ft/ft)	0.0268	0.0346	0.0531
Mean bed sediment diameter, D (ft)	0.0235	0.0235	0.0235
Specific weight of sediment, γ_s (lb/ft^3)	165.4	165.4	165.4
Specific weight of water, γ (lb/ft^3)	62.4	62.4	62.4
Kinematic viscosity of water, v (ft/sec^2)	0.00001217	0.00001217	0.00001217
Hydraulic radius or mean depth, d in wide channels (ft)	0.55	0.40	0.67
Shear velocity, U* (ft/s)	0.69	0.67	1.07
Boundary Reynold's number, R*	1330	1290	2057
Shields parameter, Ks (see HEC-20)	0.047	0.047	0.047
Shear Stress, τ_0 (lb/ft^2)	0.92	0.87	2.20
Critical bed material size, Dc (ft) = D90 Average 1	0.11	0.11	0.11
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	1.52	0.59	0.93
Equilibrium Slope, S_{eq} (ft/ft)	**0.023**	**0.051**	**0.035**

HEC-20 Equation 6.18

Another approach to determining an equilibrium slope under conditions of no upstream sediment supply is presented by the USBR using the Meyer-Peter Muller equation for beginning of transport (USBR 1984). If adjustment of the hydraulic depth due to the reduction in channel slope is included in the equation, the USBR equation is:

$$S_{eq} = K_u \frac{(D_{50})^{10/7} n^{9/7}}{(D_{90})^{5/14} q^{6/7}} \qquad (6.18)$$

where:

K_u = 60.1 English
K_u = 28.0 SI

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0268	0.0346	0.0531
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.1126	0.1126	0.1126
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	1.52	0.59	0.93
Equilibrium Slope, S_{eq} (ft/ft)	**0.0047**	**0.0106**	**0.0072**

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Max Chl Dpth	Wetted Perim	Hydraulic Radius	q	W/D Ratio
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)	(ft^2/ft)	cfs/ft	
1	3895.84	PF 1	21.7	1230.68	1232.3	1230.92	1232.31	0.000042	0.42	52.27	32.2	0.06	1.62	35.45	1.47	0.67	19.88
1	3850.61	PF 1	21.7	1231.92	1232.2		1232.29	0.01304	2.4	9.06	32.33	0.8	0.28	32.86	0.28	0.67	115.46
1	3806.24	PF 1	21.7	1231.48	1231.83		1231.88	0.006614	1.95	11.11	32.2	0.59	0.34	32.89	0.34	0.67	94.71
1	3765.08	PF 1	21.7	1231.07	1231.31	1231.31	1231.43	0.021615	2.79	7.77	32.2	1	0.24	32.68	0.24	0.67	134.17
1	3713.23	PF 1	21.7	1229.72	1229.94	1229.96	1230.09	0.031546	3.13	6.93	32.2	1.19	0.22	32.63	0.21	0.67	146.36
1	3654.26	PF 1	21.7	1226.37	1226.52	1226.61	1226.85	0.116271	4.64	4.68	32.2	2.15	0.15	32.49	0.14	0.67	214.67
1	3648.64	PF 1	21.7	1226.25	1226.43	1226.49	1226.65	0.060885	3.82	5.68	32.2	1.6	0.18	32.55	0.17	0.67	178.89
1	3605.41	PF 1	21.7	1225.66	1225.9	1225.9	1226.02	0.021292	2.78	7.8	32.2	1	0.24	32.68	0.24	0.67	134.17
1	3537.09	PF 1	21.7	1224.09	1224.32	1224.33	1224.45	0.025049	2.92	7.43	32.2	1.07	0.23	32.66	0.23	0.67	140.00
1	3531.18	PF 1	21.7	1223.86	1224.05	1224.1	1224.25	0.046931	3.53	6.15	32.2	1.42	0.19	32.58	0.19	0.67	169.47
1	3440.63	PF 1	33.8	1221.72	1222.01	1222.01	1222.15	0.020145	3.04	11.1	38.4	1	0.29	38.98	0.28	0.88	132.41
1	3366.51	PF 1	33.8	1219.05	1219.25	1219.33	1219.56	0.073742	4.5	7.51	38.4	1.79	0.2	38.79	0.19	0.88	192.00
1	3305.78	PF 1	33.8	1216.22	1216.47	1216.51	1216.66	0.032484	3.52	9.61	38.4	1.24	0.25	38.9	0.25	0.88	153.60
1	3253.32	PF 1	33.8	1214.73	1215	1215.02	1215.17	0.025031	3.25	10.4	38.41	1.1	0.27	38.95	0.27	0.88	142.26
1	3250.17	PF 1	33.8	1214.61	1214.85	1214.9	1215.06	0.038407	3.7	9.14	38.4	1.34	0.24	38.88	0.24	0.88	160.00
1	3186.18	PF 1	33.8	1212.92	1213.13	1213.21	1213.41	0.060432	4.24	7.97	38.4	1.64	0.21	38.82	0.21	0.88	182.86
1	3091.83	PF 1	33.8	1210.48	1210.77	1210.77	1210.91	0.020145	3.04	11.1	38.4	1	0.29	38.98	0.28	0.88	132.41
1	3030.37	PF 1	33.8	1208.73	1208.96	1209.02	1209.19	0.0415	3.79	8.93	38.4	1.38	0.23	38.87	0.23	0.88	166.96
1	3004.33	PF 1	33.8	1208.24	1208.53	1208.53	1208.67	0.02023	3.05	11.09	38.4	1	0.29	38.98	0.28	0.88	132.41
1	2998.41	PF 1	33.8	1208.1	1208.37	1208.39	1208.54	0.026415	3.3	10.23	38.4	1.13	0.27	38.93	0.26	0.88	142.22
1	2955.4	PF 1	33.8	1206.97	1207.24	1207.26	1207.41	0.026137	3.29	10.27	38.4	1.12	0.27	38.93	0.26	0.88	142.22
1	2914.65	PF 1	33.8	1206.18	1206.49	1206.49	1206.61	0.021438	2.81	12.04	49.36	1	0.31	50	0.24	0.68	159.23
1	2815.59	PF 1	33.8	1203.86	1204.13	1204.14	1204.3	0.025667	3.27	10.32	38.4	1.11	0.27	38.94	0.27	0.88	142.22
1	2782.59	PF 1	33.8	1202.73	1203.1	1203.02	1203.19	0.009136	2.4	14.1	38.4	0.7	0.37	39.13	0.36	0.88	103.78
1	2743.58	PF 1	33.8	1202.22	1202.5	1202.5	1202.65	0.021528	3.11	10.88	38.41	1.03	0.28	38.97	0.28	0.88	137.18
1	2704.94	PF 1	33.8	1200.78	1201.19	1201.07	1201.26	0.006465	2.16	15.68	38.65	0.6	0.41	39.39	0.40	0.87	94.27
1	2700.54	PF 1	33.8	1200.73	1201.17		1201.23	0.005107	2	16.94	39.27	0.54	0.44	40.01	0.42	0.86	89.25
1	2661.04	PF 1	33.8	1200.43	1200.72	1200.72	1200.86	0.021288	3.07	10.99	39.05	1.02	0.29	39.62	0.28	0.87	134.66
1	2616.7	PF 1	33.8	1199.4	1199.67	1199.69	1199.84	0.025171	3.26	10.38	38.4	1.1	0.27	38.94	0.27	0.88	142.22
1	2540.68	PF 1	33.8	1197.74	1197.97	1198.03	1198.2	0.046482	3.92	8.63	38.4	1.46	0.22	38.85	0.22	0.88	174.55
1	2481.7	PF 1	33.8	1196.29	1196.58	1196.58	1196.72	0.020117	3.04	11.11	38.41	1	0.29	38.98	0.29	0.88	132.45
1	2409.33	PF 1	33.8	1194.83	1195.12	1195.12	1195.26	0.019296	3	11.25	38.41	0.98	0.29	38.99	0.29	0.88	132.45
1	2320.35	PF 1	37.5	1192.71	1193.04	1193.04	1193.12	0.029572	2.23	16.85	125.51	1.07	0.33	126.1	0.13	0.30	380.33
1	2119.93	PF 1	37.5	1186.71	1186.98	1187.01	1187.17	0.029613	3.5	10.71	40.1	1.2	0.27	40.63	0.26	0.94	148.52
1	2068.55	PF 1	37.5	1185.71	1186.01	1186.01	1186.16	0.019917	3.11	12.07	40.1	1	0.3	40.7	0.30	0.94	133.67
1	2000.07	PF 1	37.5	1183.71	1184.2	1184.01	1184.26	0.004015	1.92	19.58	40.1	0.48	0.49	41.08	0.48	0.94	81.84
1	1943.65	PF 1	37.5	1183.37	1183.67	1183.67	1183.82	0.019837	3.1	12.08	40.1	1	0.3	40.7	0.30	0.94	133.67
1	1862.48	PF 1	37.5	1181.7	1182	1182	1182.15	0.021346	3.17	11.82	40.1	1.03	0.29	40.69	0.29	0.94	138.28
1	1811.06	PF 1	37.5	1180.4	1180.67	1180.7	1180.86	0.030067	3.52	10.66	40.1	1.2	0.27	40.63	0.26	0.94	148.52
1	1807.36	PF 1	37.5	1180.17	1180.38	1180.47	1180.69	0.063838	4.42	8.49	40.1	1.69	0.21	40.52	0.21	0.94	190.95
1	1777.34	PF 1	37.5	1179.71	1180.01	1180.01	1180.16	0.019998	3.11	12.05	40.1	1	0.3	40.7	0.30	0.94	133.67
1	1709.86	PF 1	37.5	1177.83	1178.07	1178.13	1178.3	0.039832	3.83	9.79	40.1	1.37	0.24	40.59	0.24	0.94	167.08
1	1652.33	PF 1	37.5	1176.71	1177.12	1177.01	1177.2	0.007432	2.31	16.25	40.1	0.64	0.41	40.91	0.40	0.94	97.80
1	1649.71	PF 1	37.5	1176.71	1177.02	1177.01	1177.16	0.019033	3.07	12.23	40.1	0.98	0.31	40.71	0.30	0.94	129.35
1	1602.35	PF 1	37.5	1175.93	1176.25	1176.23	1176.37	0.014478	2.78	13.82	45.7	0.86	0.32	46.63	0.30	0.82	142.81
1	1522.84	PF 1	37.5	1174.57	1174.87	1174.87	1175.02	0.020025	3.11	12.05	40.1	1	0.3	40.7	0.30	0.94	133.67
1	1520.83	PF 1	37.5	1174.52	1174.79	1174.82	1174.98	0.028433	3.46	10.84	40.1	1.17	0.27	40.64	0.27	0.94	148.52
1	1447.98	PF 1	37.5	1172.42	1172.69	1172.72	1172.88	0.029257	3.49	10.74	40.1	1.19	0.27	40.64	0.26	0.94	148.52

Results From EX (No Self-Form) Model								
River Sta	Q (cfs)	Min Ch El (ft)	Length Chnl (ft)	Flow Area (ft^2)	Top Width (ft)	Avg Slope	Self-Forming Channel Width (ft)	Approx. Depth (Hydraulic Toolbox)
3895.84	21.7	1230.93	45.23	29.59	20.41	0.0186	32.2	0.25
3850.61	21.7	1232.17	44.36	8.05	22.07	0.0186	32.2	0.25
3806.24	21.7	1231.73	41.16	9.03	23.68	0.0186	32.2	0.25
3765.08	21.7	1231.32	51.85	7.04	23.72	0.0186	32.2	0.25
3713.23	21.7	1229.97	58.96	5.58	13.88	0.0186	32.2	0.25
3654.26	21.7	1226.59	5.63	2.91	23.94	0.0186	32.2	0.25
3648.64	21.7	1226.5	43.22	8.88	26.98	0.0186	32.2	0.25
3605.41	21.7	1225.91	68.33	9.86	46.51	0.0186	32.2	0.25
3537.09	21.7	1224.36	5.91	7.41	28.73	0.0186	32.2	0.25
3531.18	21.7	1224.13	90.55	5.43	23.11	0.0186	32.2	0.25
3440.63	33.8	1221.99	74.11	12.58	55.96	0.0259	38.4	0.27
3366.51	33.8	1219.32	60.74	7.51	29.04	0.0259	38.4	0.27
3305.78	33.8	1216.49	52.46	7.44	24.21	0.0259	38.4	0.27
3253.32	33.8	1214.98	3.15	11.47	59.68	0.0259	38.4	0.27
3250.17	33.8	1214.88	63.99	10.72	62.79	0.0259	38.4	0.27
3186.18	33.8	1213.19	94.35	12.7	56.92	0.0259	38.4	0.27
3091.83	33.8	1210.75	61.46	9.43	35.53	0.0259	38.4	0.27
3030.37	33.8	1209	26.04	12.72	61.16	0.0259	38.4	0.27
3004.33	33.8	1208.51	5.91	12.55	51.51	0.0259	38.4	0.27
2998.41	33.8	1208.37	43.01	11.07	53.02	0.0259	38.4	0.27
2955.4	33.8	1207.24	40.75	12.96	64.82	0.0259	38.4	0.27
2914.65	33.8	1206.45	99.06	11.29	73.74	0.0259	38.4	0.27
2815.59	33.8	1204.13	33.00	15.1	96.03	0.0259	38.4	0.27
2782.59	33.8	1203	39.02	8.25	27.61	0.0259	38.4	0.27
2743.58	33.8	1202.49	38.63	16.73	117.19	0.0259	38.4	0.27
2704.94	33.8	1201.05	4.40	13.16	75.83	0.0259	38.4	0.27
2700.54	33.8	1201.55	39.50	11.46	59.3	0.0259	38.4	0.27
2661.04	33.8	1200.7	44.34	7.68	71.15	0.0259	38.4	0.27
2616.7	33.8	1199.67	76.03	20.26	172.82	0.0259	38.4	0.27
2540.68	33.8	1198.01	58.97	17.17	136.97	0.0259	38.4	0.27
2481.7	33.8	1196.68	72.38	15.58	89.63	0.0259	38.4	0.27
2409.33	33.8	1195.25	88.97	14.05	164.52	0.0259	38.4	0.27
2320.35	37.5	1193	200.44	17.91	133.09	0.0233	40.1	0.29
2119.93	37.5	1187	51.36	8.87	25.05	0.0233	40.1	0.29
2068.55	37.5	1186	68.48	8.17	29.88	0.0233	40.1	0.29
2000.07	37.5	1184	56.42	9.66	11.55	0.0233	40.1	0.29
1943.65	37.5	1183.66	81.17	9.43	18.96	0.0233	40.1	0.29
1862.48	37.5	1181.99	51.42	6.21	15.25	0.0233	40.1	0.29
1811.06	37.5	1180.69	3.70	8.24	12.98	0.0233	40.1	0.29
1807.36	37.5	1180.46	30.02	6.05	13.06	0.0233	40.1	0.29
1777.34	37.5	1180	67.48	8.65	25.25	0.0233	40.1	0.29
1709.86	37.5	1178.12	57.53	9.57	45.92	0.0233	40.1	0.29
1652.33	37.5	1177	2.62	12.66	33.45	0.0233	40.1	0.29
1649.71	37.5	1177	47.36	13.95	35.38	0.0233	40.1	0.29
1602.35	37.5	1176.22	79.51	11.11	30.98	0.0233	40.1	0.29
1522.84	37.5	1174.86	2.01	12.67	46.01	0.0233	40.1	0.29
1520.83	37.5	1174.81	72.85	11.18	45.02	0.0233	40.1	0.29
1447.98	37.5	1172.71		13.36	68	0.0233	40.1	0.29

n = 0.03

Parameter	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Discharge (cfs)	37.5	33.8	21.7
Average Hydr Radius (ft)	0.29	0.28	0.35
Average Width (ft)	45.79	38.98	32.21
Average Discharge Per Unit Width, q (cfs/ft)	0.89	0.87	0.67
Average Energy Slope, S (dimensionless)	0.0248	0.0276	0.0343
Average Froude Number, Fr (dimensionless)	1.055	1.104	1.088
Average Manning n-value	0.030	0.030	0.030
Average Velocity (fps)	3.133	3.216	2.838
Average Depth (ft)	0.305	0.284	0.369
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.1126	0.1126	0.1126
Temperature (˚F)	60	60	60
Kinematic viscosity of water, v (ft^2/s)	0.00001217	0.00001217	0.00001217
Unit Weight of Water, γ_w (lb/ft^3)	62.4	62.4	62.4
Specific Weight of Sediment, γ_s (lb/ft^3)	165.4	165.4	165.4

Albuquerque Metroploitan Arroyo Flood Control Authority Sediment and Erosion Design Guide Equation 3.59

$$S_{eq} = CQ^{-0.133}$$

$$C = 18.28 n^2 F^{0.133} F_r^{2.133}$$

F = width/depth ratio typicall about 40 (Leopold and Miller, 1956; Harvey, 1985)

	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
Reach 1						
Flowrate, Q (cfs)	37.5	37.5	37.5	37.5	37.5	37.5
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	153.57	153.57	153.57	153.57	153.57	153.57
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0150	0.0174	0.0200	0.0227	0.0257	0.0321
Equilibrium Slope, S_{eq} (ft/ft)	**0.0093**	**0.0107**	**0.0123**	**0.0140**	**0.0159**	**0.0198**
Reach 2						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	33.8	33.8	33.8	33.8	33.8	33.8
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	141.89	141.89	141.89	141.89	141.89	141.89
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0149	0.0172	0.0198	0.0225	0.0254	0.0318
Equilibrium Slope, S_{eq} (ft/ft)	**0.0093**	**0.0108**	**0.0124**	**0.0141**	**0.0159**	**0.0199**
Reach 3						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	21.7	21.7	21.7	21.7	21.7	21.7
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	134.78	134.78	134.78	134.78	134.78	134.78
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0148	0.0171	0.0196	0.0223	0.0252	0.0316
Equilibrium Slope, S_{eq} (ft/ft)	**0.0098**	**0.0114**	**0.0130**	**0.0148**	**0.0168**	**0.0210**
Avg. Across All Reaches =	**0.0095**	**0.0110**	**0.0126**	**0.0143**	**0.0162**	**0.0202**

HEC-20 Equation 6.17

$$S_{eq} = \left[K_s D_c \left(\frac{\gamma_s - \gamma}{\gamma} \right) \right]^{-\frac{10}{7}} \left(\frac{1.486}{qn} \right)^{\frac{6}{7}}$$

Dc = D90

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0268	0.0346	0.0531
Mean bed sediment diameter, D (ft)	0.1126	0.1126	0.1126
Specific weight of sediment, γ_s (lb/ft^3)	165.4	165.4	165.4
Specific weight of water, γ (lb/ft^3)	62.4	62.4	62.4
Kinematic viscosity of water, v (ft/sec^2)	0.00001217	0.00001217	0.00001217
Hydraulic radius or mean depth, d in wide channels (ft)	0.31	0.28	0.37
Shear velocity, U* (ft/s)	0.51	0.56	0.79
Boundary Reynold's number, R*	4752	5204	7351
Shields parameter, Ks (see HEC-20)	0.047	0.047	0.047
Shear Stress, τ_0 (lb/ft^2)	0.51	0.61	1.22
Critical bed material size, Dc (ft) = D90 Average 1	0.11	0.11	0.11
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.89	0.87	0.67
Equilibrium Slope, S_{eq} (ft/ft)	**0.036**	**0.037**	**0.046**

HEC-20 Equation 6.18

Another approach to determining an equilibrium slope under conditions of no upstream sediment supply is presented by the USBR using the Meyer-Peter Muller equation for beginning of transport (USBR 1984). If adjustment of the hydraulic depth due to the reduction in channel slope is included in the equation, the USBR equation is:

$$S_{eq} = K_u \frac{(D_{50})^{10/7} n^{9/7}}{(D_{90})^{5/14} q^{6/7}} \qquad (6.18)$$

where:

K_u = 60.1 English
K_u = 28.0 SI

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0268	0.0346	0.0531
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.112614013	0.112614013	0.112614013
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.89	0.87	0.67
Equilibrium Slope, S_{eq} (ft/ft)	**0.0075**	**0.0077**	**0.0095**

River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Max Chl Dpth	Wetted Perim	Hydraulic Radius	q	W/D Ratio	Existing Velocity	Length Chnl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)	(ft^2/ft)	cfs/ft		(ft/s)	(ft)
1	3895.84	21.7	1230.93	1233	1231.558	1233.03	0.000139	0.73	29.59	20.41	0.11	2.09	21.06	1.41	1.063204	9.7655502	0.73	45.23
1	3850.61	21.7	1232.17	1232.9		1233	0.01153	2.7	8.05	22.07	0.79	0.71	22.28	0.36	0.983235	31.084507	2.75	44.36
1	3806.24	21.7	1231.73	1232.5		1232.54	0.008672	2.4	9.03	23.68	0.69	0.72	23.98	0.38	0.916385	32.888889	2.14	41.16
1	3765.08	21.7	1231.32	1231.9	1231.872	1232.02	0.019893	3.08	7.04	23.72	1	0.55	24.01	0.29	0.91484	43.127273	3.08	51.85
1	3713.23	21.7	1229.97	1230.7	1230.742	1230.95	0.020959	3.89	5.58	13.88	1.08	0.75	14	0.40	1.563401	18.506667	3.82	58.96
1	3654.26	21.7	1230.13	1230.3	1230.304	1230.39	0.042236	2.36	9.2	53.5	1	0.17	53.55	0.17	0.405607	314.70588	7.74	5.63
1	3648.64	21.7	1226.39	1226.5	1226.652	1227.18	0.576943	6.61	3.28	28.93	3.46	0.11	28.97	0.11	0.750086	263	2.46	43.22
1	3605.41	21.7	1225.89	1226.1		1226.09	0.011142	1.57	13.82	83.93	0.68	0.17	83.99	0.16	0.258549	493.70588	2.16	68.33
1	3537.09	21.7	1225	1225.3	1225.276	1225.31	0.049493	1.52	14.28	181.11	0.95	0.28	181.17	0.08	0.119817	646.82143	2.93	5.91
1	3531.18	21.7	1220.2	1220.2	1220.285	1220.45	0.771985	3.69	5.88	154.41	3.34	0.04	154.42	0.04	0.140535	3860.25	3.95	90.55
1	3440.63	33.8	1219.29	1219.4		1219.48	0.010671	1.48	22.87	147.31	0.66	0.16	147.37	0.16	0.229448	920.6875	2.69	74.11
1	3366.51	33.8	1218.55	1218.7		1218.75	0.00908	1.42	23.86	145.08	0.62	0.17	145.13	0.16	0.232975	853.41176	4.49	60.74
1	3305.78	33.8	1217.94	1218.2		1218.2	0.009042	1.69	20.02	93.2	0.64	0.22	93.27	0.21	0.362661	423.63636	4.2	52.46
1	3253.32	33.8	1217.41	1217.6	1217.599	1217.69	0.040833	2.46	13.75	73.34	1	0.19	73.41	0.19	0.460867	386	2.88	3.15
1	3250.17	33.8	1213.35	1213.4	1213.571	1214.3	1.2146	7.51	4.5	57.34	4.72	0.08	57.37	0.08	0.589466	716.75	2.89	63.99
1	3186.18	33.8	1212.71	1213.1		1213.16	0.010537	2.47	13.66	40.1	0.75	0.35	40.21	0.34	0.842893	114.57143	2.79	94.35
1	3091.83	33.8	1211.75	1212.1		1212.13	0.011198	2.32	14.57	49.41	0.75	0.3	49.51	0.29	0.684072	164.7	3.4	61.46
1	3030.37	33.8	1211.13	1211.4		1211.45	0.010915	2.06	16.44	65.55	0.72	0.25	65.61	0.25	0.515637	262.2	2.82	26.04
1	3004.33	33.8	1210.86	1211.1	1211.065	1211.15	0.031241	2.27	14.91	73.39	0.89	0.2	73.46	0.20	0.460553	366.95	3.72	5.91
1	2998.41	33.8	1205.85	1206	1206.107	1206.75	0.773182	7.17	4.71	45.79	3.94	0.1	45.83	0.10	0.738152	457.9	3.39	43.01
1	2955.4	33.8	1205.42	1205.7		1205.74	0.010591	2.04	16.56	65.28	0.71	0.26	65.36	0.25	0.51777	251.07692	2.61	40.75
1	2914.65	33.8	1205.01	1205.2		1205.3	0.01052	1.91	17.66	76.28	0.7	0.23	76.36	0.23	0.443104	331.65217	2.58	99.06
1	2815.59	33.8	1204.02	1204.2		1204.25	0.010565	1.65	20.46	110.6	0.68	0.19	110.66	0.18	0.305606	582.10526	2.24	33.00
1	2782.59	33.8	1203.69	1203.9		1203.91	0.010055	1.57	21.5	120.68	0.66	0.18	120.74	0.18	0.28008	670.44444	4.07	39.02
1	2743.58	33.8	1203.3	1203.5		1203.51	0.010166	1.55	21.8	125.91	0.66	0.17	125.97	0.17	0.268446	740.64706	2.02	38.63
1	2704.94	33.8	1202.9	1203	1203.028	1203.09	0.046149	2.02	16.72	131.07	1	0.13	131.11	0.13	0.257877	1008.2308	2.49	4.40
1	2700.54	33.8	1199	1199.1	1199.144	1199.49	0.868102	5.25	6.44	108.9	3.81	0.06	108.91	0.06	0.310376	1815	0.88	39.50
1	2661.04	33.8	1198.6	1198.8	1198.737	1198.85	0.005685	1.34	25.16	116.59	0.51	0.22	116.66	0.22	0.289905	529.95455	1.73	44.34
1	2616.7	33.8	1198.16	1198.3	1198.302	1198.37	0.025031	2.12	15.92	112.86	1	0.14	112.91	0.14	0.299486	806.14286	1.73	76.03
1	2540.68	33.8	1197.39	1197.7	1197.535	1197.72	0.001906	0.99	34.08	109.67	0.31	0.31	109.77	0.31	0.308197	353.77419	1.97	58.97
1	2481.7	33.8	1196.79	1197.7		1197.71	0.000039	0.29	118.15	133.14	0.05	0.92	133.36	0.89	0.253868	144.71739	1.69	72.38
1	2409.33	33.8	1196.06	1197.7		1197.71	0.000005	0.14	233.84	147	0.02	1.65	147.54	1.58	0.229932	89.090909	1.57	88.97
1	2320.35	37.5	1195.17	1197.7	1195.345	1197.71	0.000003	0.15	247.43	105.19	0.02	2.54	106.02	2.33	0.356498	41.413386	2.09	200.44
1	2119.93	37.5	1185.98	1186.2	1186.223	1186.34	0.016928	2.59	14.48	56.71	0.9	0.26	56.8	0.25	0.661259	218.11538	4.1	51.36
1	2068.55	37.5	1185.47	1185.7		1185.79	0.00715	1.74	21.57	80.6	0.59	0.27	80.69	0.27	0.465261	298.51852	3.42	68.48
1	2000.07	37.5	1184.78	1185.1		1185.18	0.011419	2.39	15.72	51.84	0.76	0.31	51.94	0.30	0.72338	167.22581	3.38	56.42
1	1943.65	37.5	1184.21	1184.5		1184.61	0.008884	2.19	17.1	53	0.68	0.33	53.11	0.32	0.707547	160.60606	4.28	81.17
1	1862.48	37.5	1183.39	1183.7		1183.82	0.010726	2.44	15.34	46.5	0.75	0.34	46.61	0.33	0.806452	136.76471	7.95	51.42
1	1811.06	37.5	1182.84	1183.1	1183.104	1183.23	0.036813	2.9	12.95	49.93	1	0.26	50.02	0.26	0.751051	192.03846	10.33	3.7
1	1807.36	37.5	1181.04	1181.2	1181.353	1181.9	0.435568	6.77	5.54	38.13	3.13	0.15	38.18	0.15	0.983478	254.2	3.33	30.02
1	1777.34	37.5	1180.75	1181.1		1181.19	0.009225	2.33	16.08	46.7	0.7	0.35	46.82	0.34	0.802998	133.42857	3.56	67.48
1	1709.86	37.5	1180.06	1180.4		1180.53	0.010668	2.56	14.67	41.44	0.76	0.36	41.56	0.35	0.904923	115.11111	5.96	57.53
1	1652.33	37.5	1179.47	1179.7	1179.747	1179.88	0.035952	2.96	12.69	46.57	1	0.28	46.66	0.27	0.805239	166.32143	9.35	2.62
1	1649.71	37.5	1177.56	1177.7	1177.884	1178.65	0.639216	7.81	4.8	35.56	3.75	0.14	35.6	0.13	1.054556	254	2.11	47.36
1	1602.35	37.5	1177.09	1177.4		1177.47	0.009257	2.13	17.6	58.81	0.69	0.3	58.9	0.30	0.637647	196.03333	3.32	79.51
1	1522.84	37.5	1176.29	1176.6	1176.556	1176.69	0.036958	2.91	12.87	49.25	1.01	0.27	49.34	0.26	0.761421	182.40741	10.23	2.01
1	1520.83	37.5	1174.79	1174.9	1175.074	1175.77	0.714191	7.43	5.05	43.77	3.86	0.12	43.8	0.12	0.856751	364.75	3.05	72.85
1	1447.98	37.5	1174.05	1174.3	1174.272	1174.4	0.010103	2.11	17.81	64.7	0.71	0.28	64.79	0.27	0.579598	231.07143	3.21	

Parameter	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Discharge (cfs)	37.5	33.8	21.7
Average Hydr Radius (ft)	0.51	0.35	0.50
Average Width (ft)	60.55	103.67	31.28
Average Discharge Per Unit Width, q (cfs/ft)	0.66	0.38	0.95
Average Energy Slope, S (dimensionless)	0.0094	0.0091	0.0121
Average Froude Number, Fr (dimensionless)	0.656	0.590	0.725
Average Manning n-value	0.030	0.030	0.030
Average Velocity (fps)	2.063	1.565	2.395
Average Depth (ft)	0.534	0.358	0.832
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.1126	0.1126	0.1126
Temperature (˚F)	60	60	60
Kinematic viscosity of water, v (ft^2/s)	0.00001217	0.00001217	0.00001217
Unit Weight of Water, γ_w (lb/ft^3)	62.4	62.4	62.4
Specific Weight of Sediment, γ_s (lb/ft^3)	165.4	165.4	165.4

**Note: Average values exclude cross-sections at drop structure tops and toes*

Albuquerque Metroploitan Arroyo Flood Control Authority Sediment and Erosion Design Guide Equation 3.59

$$S_{eq} = CQ^{-0.133} \qquad C = 18.28 n^2 F^{0.133} F_r^{2.133}$$

F = width/depth ratio typicall about 40 (Leopold and Miller, 1956; Harvey, 1985)

	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
Reach 1						
Flowrate, Q (cfs)	33.8	33.8	33.8	33.8	33.8	33.8
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	169.83	169.83	169.83	169.83	169.83	169.83
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0152	0.0176	0.0202	0.0230	0.0260	0.0326
Equilibrium Slope, S_{eq} (ft/ft)	**0.0095**	**0.0110**	**0.0127**	**0.0144**	**0.0163**	**0.0204**
Reach 2						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	21.7	21.7	21.7	21.7	21.7	21.7
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	452.43	452.43	452.43	452.43	452.43	452.43
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0173	0.0201	0.0231	0.0262	0.0296	0.0371
Equilibrium Slope, S_{eq} (ft/ft)	**0.0115**	**0.0133**	**0.0153**	**0.0174**	**0.0197**	**0.0246**
Reach 3						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	13	13	13	13	13	13
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	104.85	104.85	104.85	104.85	104.85	104.85
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0143	0.0165	0.0190	0.0216	0.0244	0.0305
Equilibrium Slope, S_{eq} (ft/ft)	**0.0101**	**0.0118**	**0.0135**	**0.0154**	**0.0173**	**0.0217**

HEC-20 Equation 6.17

$$S_{eq} = \left[K_s D_c \left(\frac{\gamma_s - \gamma}{\gamma} \right) \right]^{\frac{10}{7}} \left(\frac{1.486}{qn} \right)^{\frac{6}{7}}$$

$D_C = D_{90}$

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0268	0.0346	0.0531
Mean bed sediment diameter, D (ft)	0.0004	0.0004	0.0004
Specific weight of sediment, γ_s (lb/ft^3)	165.4	165.4	165.4
Specific weight of water, γ (lb/ft^3)	62.4	62.4	62.4
Kinematic viscosity of water, v (ft/sec^2)	0.00001217	0.00001217	0.00001217
Hydraulic radius or mean depth, d in wide channels (ft)	0.53	0.36	0.83
Shear velocity, U* (ft/s)	0.68	0.63	1.19
Boundary Reynold's number, R*	21	19	36
Shields parameter, Ks (see HEC-20)	0.047	0.047	0.047
Shear Stress, τ_0 (lb/ft^2)	0.89	0.77	2.76
Critical bed material size, D_c (ft) = D_{90} Average 1	0.11	0.11	0.11
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.66	0.38	0.95
Equilibrium Slope, S_{eq} (ft/ft)	**0.046**	**0.075**	**0.034**

HEC-20 Equation 6.18

Another approach to determining an equilibrium slope under conditions of no upstream sediment supply is presented by the USBR using the Meyer-Peter Muller equation for beginning of transport (USBR 1984). If adjustment of the hydraulic depth due to the reduction in channel slope is included in the equation, the USBR equation is:

$$S_{eq} = K_u \frac{(D_{50})^{10/7} n^{9/7}}{(D_{90})^{5/14} q^{6/7}} \qquad (6.18)$$

where:

K_u = 60.1 English
K_u = 28.0 SI

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0268	0.0346	0.0531
D_{50} (ft) Average 1	0.0235	0.0235	0.0235
D_{90} (ft) Average 1	0.1126	0.1126	0.1126
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.66	0.38	0.95
Equilibrium Slope, S_{eq} (ft/ft)	**0.0096**	**0.0156**	**0.0071**

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Max Chl Dpth	Wetted Perim	Hydraulic Radius	q	W/D Ratio	Existing Velocity	Length Chnl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(ft)	(ft^2/ft)	cfs/ft		(ft/s)	(ft)
1	3895.84	21.7	1230.93	1233.02	1231.558	1233.03	0.000139	0.73	29.59	20.41	0.11	2.09	21.06	1.40	1.063204	9.7655502	0.73	45.23
1	3850.61	21.7	1232.17	1232.89		1233	0.01153	2.7	8.05	22.07	0.79	0.71	22.28	0.36	0.983235	31.084507	2.75	44.36
1	3806.24	21.7	1231.73	1232.45		1232.54	0.008672	2.4	9.03	23.68	0.69	0.72	23.98	0.38	0.916385	32.888889	2.14	41.16
1	3765.08	21.7	1231.32	1231.87	1231.872	1232.02	0.019893	3.08	7.04	23.72	1	0.55	24.01	0.29	0.91484	43.127273	3.08	51.85
1	3713.23	21.7	1229.97	1230.72	1230.742	1230.95	0.020959	3.89	5.58	13.88	1.08	0.75	14	0.40	1.563401	18.506667	3.82	58.96
1	3654.26	21.7	1230.13	1230.3	1230.304	1230.39	0.042236	2.36	9.2	53.5	1	0.17	53.55	0.17	0.405607	314.70588	7.74	5.63
1	3648.64	21.7	1226.39	1226.51	1226.652	1227.18	0.576943	6.61	3.28	28.93	3.46	0.11	28.97	0.11	0.750086	263	2.46	43.22
1	3605.41	21.7	1225.89	1226.06		1226.09	0.011142	1.57	13.82	83.93	0.68	0.17	83.99	0.16	0.258549	493.70588	2.16	68.33
1	3537.09	21.7	1225	1225.28	1225.276	1225.31	0.049493	1.52	14.28	181.11	0.95	0.28	181.17	0.08	0.119817	646.82143	2.93	5.91
1	3531.18	21.7	1220.2	1220.24	1220.285	1220.45	0.771985	3.69	5.88	154.41	3.34	0.04	154.42	0.04	0.140535	3860.25	3.95	90.55
1	3440.63	33.8	1219.29	1219.45		1219.48	0.010671	1.48	22.87	147.31	0.66	0.16	147.37	0.16	0.229448	920.6875	2.69	74.11
1	3366.51	33.8	1218.55	1218.72		1218.75	0.00908	1.42	23.86	145.08	0.62	0.17	145.13	0.16	0.232975	853.41176	4.49	60.74
1	3305.78	33.8	1217.94	1218.16		1218.2	0.009042	1.69	20.02	93.2	0.64	0.22	93.27	0.21	0.362661	423.63636	4.2	52.46
1	3253.32	33.8	1217.41	1217.6	1217.599	1217.69	0.040833	2.46	13.75	73.34	1	0.19	73.41	0.19	0.460867	386	2.88	3.15
1	3250.17	33.8	1213.35	1213.43	1213.571	1214.3	1.2146	7.51	4.5	57.34	4.72	0.08	57.37	0.08	0.589466	716.75	2.89	63.99
1	3186.18	33.8	1212.71	1213.06		1213.16	0.010537	2.47	13.66	40.1	0.75	0.35	40.21	0.34	0.842893	114.57143	2.79	94.35
1	3091.83	33.8	1211.75	1212.05		1212.13	0.011198	2.32	14.57	49.41	0.75	0.3	49.51	0.29	0.684072	164.7	3.4	61.46
1	3030.37	33.8	1211.13	1211.39		1211.45	0.010915	2.06	16.44	65.55	0.72	0.25	65.61	0.25	0.515637	262.2	2.82	26.04
1	3004.33	33.8	1210.86	1211.07	1211.065	1211.15	0.031241	2.27	14.91	73.39	0.89	0.2	73.46	0.20	0.460553	366.95	3.72	5.91
1	2998.41	33.8	1205.85	1205.95	1206.107	1206.75	0.773182	7.17	4.71	45.79	3.94	0.1	45.83	0.10	0.738152	457.9	3.39	43.01
1	2955.4	33.8	1205.42	1205.68		1205.74	0.010591	2.04	16.56	65.28	0.71	0.26	65.36	0.25	0.51777	251.07692	2.61	40.75
1	2914.65	33.8	1205.01	1205.24		1205.3	0.01052	1.91	17.66	76.28	0.7	0.23	76.36	0.23	0.443104	331.65217	2.58	99.06
1	2815.59	33.8	1204.02	1204.21		1204.25	0.010565	1.65	20.46	110.6	0.68	0.19	110.66	0.18	0.305606	582.10526	2.24	33.00
1	2782.59	33.8	1203.69	1203.87		1203.91	0.010055	1.57	21.5	120.68	0.66	0.18	120.74	0.18	0.28008	670.44444	4.07	39.02
1	2743.58	33.8	1203.3	1203.47		1203.51	0.010166	1.55	21.8	125.91	0.66	0.17	125.97	0.17	0.268446	740.64706	2.02	38.63
1	2704.94	33.8	1202.9	1203.03	1203.028	1203.09	0.046149	2.02	16.72	131.07	1	0.13	131.11	0.13	0.257877	1008.2308	2.49	4.40
1	2700.54	33.8	1199	1199.06	1199.144	1199.49	0.868102	5.25	6.44	108.9	3.81	0.06	108.91	0.06	0.310376	1815	0.88	39.50
1	2661.04	33.8	1198.6	1198.82	1198.737	1198.85	0.005685	1.34	25.16	116.59	0.51	0.22	116.66	0.22	0.289905	529.95455	1.73	44.34
1	2616.7	33.8	1198.16	1198.3	1198.302	1198.37	0.025031	2.12	15.92	112.86	1	0.14	112.91	0.14	0.299486	806.14286	1.73	76.03
1	2540.68	33.8	1197.39	1197.7	1197.535	1197.72	0.001906	0.99	34.08	109.67	0.31	0.31	109.77	0.31	0.308197	353.77419	1.97	58.97
1	2481.7	33.8	1196.79	1197.71		1197.71	0.000039	0.29	118.15	133.14	0.05	0.92	133.36	0.89	0.253868	144.71739	1.69	72.38
1	2409.33	33.8	1196.06	1197.71		1197.71	0.000005	0.14	233.84	147	0.02	1.65	147.54	1.58	0.229932	89.090909	1.57	88.97
1	2320.35	37.5	1195.17	1197.71	1195.345	1197.71	0.000003	0.15	247.43	105.19	0.02	2.54	106.02	2.33	0.356498	41.413386	2.09	200.44
1	2119.93	37.5	1185.98	1186.24	1186.223	1186.34	0.016928	2.59	14.48	56.71	0.9	0.26	56.8	0.25	0.661259	218.11538	4.1	51.36
1	2068.55	37.5	1185.47	1185.74		1185.79	0.00715	1.74	21.57	80.6	0.59	0.27	80.69	0.27	0.465261	298.51852	3.42	68.48
1	2000.07	37.5	1184.78	1185.09		1185.18	0.011419	2.39	15.72	51.84	0.76	0.31	51.94	0.30	0.72338	167.22581	3.38	56.42
1	1943.65	37.5	1184.21	1184.54		1184.61	0.008884	2.19	17.1	53	0.68	0.33	53.11	0.32	0.707547	160.60606	4.28	81.17
1	1862.48	37.5	1183.39	1183.73		1183.82	0.010726	2.44	15.34	46.5	0.75	0.34	46.61	0.33	0.806452	136.76471	7.95	51.42
1	1811.06	37.5	1182.84	1183.1	1183.104	1183.23	0.036813	2.9	12.95	49.93	1	0.26	50.02	0.26	0.751051	192.03846	10.33	3.7
1	1807.36	37.5	1181.04	1181.19	1181.353	1181.9	0.435568	6.77	5.54	38.13	3.13	0.15	38.18	0.15	0.983478	254.2	3.33	30.02
1	1777.34	37.5	1180.75	1181.1		1181.19	0.009225	2.33	16.08	46.7	0.7	0.35	46.82	0.34	0.802998	133.42857	3.56	67.48
1	1709.86	37.5	1180.06	1180.42		1180.53	0.010668	2.56	14.67	41.44	0.76	0.36	41.56	0.35	0.904923	115.11111	5.96	57.53
1	1652.33	37.5	1179.47	1179.75	1179.747	1179.88	0.035952	2.96	12.69	46.57	1	0.28	46.66	0.27	0.805239	166.32143	9.35	2.62
1	1649.71	37.5	1177.56	1177.7	1177.884	1178.65	0.639216	7.81	4.8	35.56	3.75	0.14	35.6	0.13	1.054556	254	2.11	47.36
1	1602.35	37.5	1177.09	1177.53		1177.57	0.002613	1.45	25.88	59.64	0.39	0.44	59.79	0.43	0.628773	135.54545	3.32	79.51
1	1522.84	37.5	1176.29	1177.5		1177.5	0.000229	0.61	61.84	54.9	0.1	1.21	55.29	1.12	0.68306	45.371901	10.23	2.01
1	1520.83	37.5	1174.79	1177.5		1177.5	0.000021	0.26	143.2	74.89	0.03	2.71	75.77	1.89	0.500734	27.634686	3.05	72.85
1	1447.98	37.5	1174.05	1177.5	1174.272	1177.5	0.000002	0.15	253.16	83.73	0.02	3.45	84.85	2.98	0.447868	24.269565	3.21	

Parameter	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Discharge (cfs)	37.5	33.8	21.7
Average Hydr Radius (ft)	0.79	0.35	0.50
Average Width (ft)	62.54	103.67	31.28
Average Discharge Per Unit Width, q (cfs/ft)	0.65	0.38	0.95
Average Energy Slope, S (dimensionless)	0.0078	0.0091	0.0121
Average Froude Number, Fr (dimensionless)	0.557	0.590	0.725
Average Manning n-value	0.030	0.030	0.030
Average Velocity (fps)	1.799	1.565	2.395
Average Depth (ft)	0.865	0.358	0.832
D50 (ft) Average 1	0.0235	0.0235	0.0235
D90 (ft) Average 1	0.1126	0.1126	0.1126
Temperature (˚F)	60	60	60
Kinematic viscosity of water, v (ft^2/s)	0.00001217	0.00001217	0.00001217
Unit Weight of Water, γ_w (lb/ft^3)	62.4	62.4	62.4
Specific Weight of Sediment, γ_s (lb/ft^3)	165.4	165.4	165.4

**Note: Average values exclude cross-sections at drop structure tops and toes*

Albuquerque Metroploitan Arroyo Flood Control Authority
Sediment and Erosion Design Guide
Equation 3.59

$$S_{eq} = CQ^{-0.133}$$

$$C = 18.28 n^2 F^{0.133} F_r^{2.133}$$

F = width/depth ratio typicall about 40 (Leopold and Miller, 1956; Harvey, 1985)

	Fr = 0.7	Fr = 0.75	Fr = 0.8	Fr = 0.85	Fr = 0.9	Fr = 1.0
Reach 1						
Flowrate, Q (cfs)	33.8	33.8	33.8	33.8	33.8	33.8
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	143.10	143.10	143.10	143.10	143.10	143.10
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0149	0.0172	0.0198	0.0225	0.0254	0.0318
Equilibrium Slope, S_{eq} (ft/ft)	**0.0093**	**0.0108**	**0.0124**	**0.0141**	**0.0159**	**0.0199**
Reach 2						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	21.7	21.7	21.7	21.7	21.7	21.7
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	452.43	452.43	452.43	452.43	452.43	452.43
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0173	0.0201	0.0231	0.0262	0.0296	0.0371
Equilibrium Slope, S_{eq} (ft/ft)	**0.0115**	**0.0133**	**0.0153**	**0.0174**	**0.0197**	**0.0246**
Reach 3						
	Fr = 0.7	**Fr = 0.75**	**Fr = 0.8**	**Fr = 0.85**	**Fr = 0.9**	**Fr = 1.0**
Flowrate, Q (cfs)	13	13	13	13	13	13
Manning roughness coefficient, n	0.030	0.030	0.030	0.030	0.030	0.030
Width/Depth Ratio, F (ft/ft)	104.85	104.85	104.85	104.85	104.85	104.85
Froude Number, Fr	0.700	0.750	0.800	0.850	0.900	1.000
C	0.0143	0.0165	0.0190	0.0216	0.0244	0.0305
Equilibrium Slope, S_{eq} (ft/ft)	**0.0101**	**0.0118**	**0.0135**	**0.0154**	**0.0173**	**0.0217**

HEC-20 Equation 6.17

$$S_{eq} = \left[K_s D_c \left(\frac{\gamma_s - \gamma}{\gamma} \right) \right]^{\frac{10}{7}} \left(\frac{1.486}{qn} \right)^{\frac{6}{7}}$$

$D_C = D_{90}$

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0268	0.0346	0.0531
Mean bed sediment diameter, D (ft)	0.0004	0.0004	0.0004
Specific weight of sediment, γ_s (lb/ft^3)	165.4	165.4	165.4
Specific weight of water, γ (lb/ft^3)	62.4	62.4	62.4
Kinematic viscosity of water, v (ft/sec^2)	0.00001217	0.00001217	0.00001217
Hydraulic radius or mean depth, d in wide channels (ft)	0.87	0.36	0.83
Shear velocity, U* (ft/s)	0.86	0.63	1.19
Boundary Reynold's number, R*	26	19	36
Shields parameter, Ks (see HEC-20)	0.047	0.047	0.047
Shear Stress, τ_0 (lb/ft^2)	1.45	0.77	2.76
Critical bed material size, D_c (ft) = D_{90} Average 1	0.11	0.11	0.11
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.65	0.38	0.95
Equilibrium Slope, S_{eq} (ft/ft)	**0.047**	**0.075**	**0.034**

HEC-20 Equation 6.18

Another approach to determining an equilibrium slope under conditions of no upstream sediment supply is presented by the USBR using the Meyer-Peter Muller equation for beginning of transport (USBR 1984). If adjustment of the hydraulic depth due to the reduction in channel slope is included in the equation, the USBR equation is:

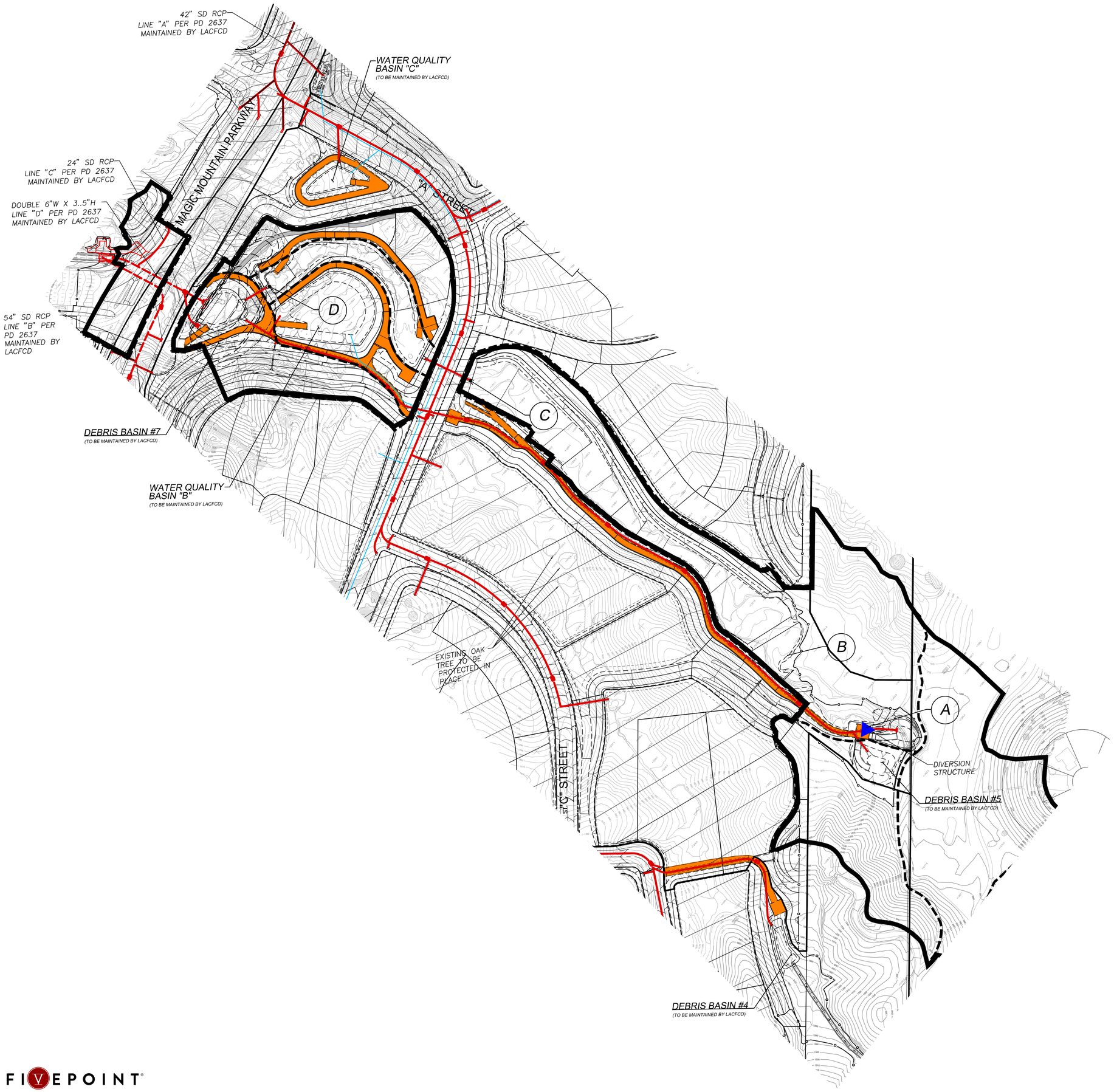
$$S_{eq} = K_u \frac{(D_{50})^{10/7} n^{9/7}}{(D_{90})^{5/14} q^{6/7}} \qquad (6.18)$$

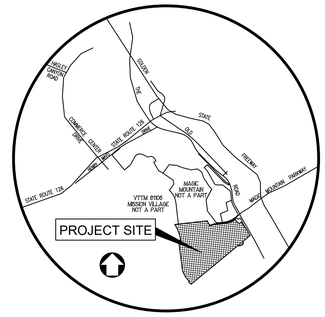
where:

K_u = 60.1 English
K_u = 28.0 SI

	Reach 1 STA 1447.98 to STA 2320.35	Reach 2 STA 2409.33 to STA 3440.63	Reach 3 STA 3531.18 to STA 3895.84
Original stream energy slope, S (ft/ft)	0.0268	0.0346	0.0531
D_{50} (ft) Average 1	0.0235	0.0235	0.0235
D_{90} (ft) Average 1	0.1126	0.1126	0.1126
Manning roughness coefficient, n	0.030	0.030	0.030
Channel discharge per unit width, q (ft^2/s)	0.65	0.38	0.95
Equilibrium Slope, S_{eq} (ft/ft)	**0.0098**	**0.0156**	**0.0071**

3 – Drainage Map





VICINITY MAP
NOT TO SCALE

LEGEND:

- PHASING LIMITS
- PROPOSED 100 WATERSHED AREA
- PROPOSED SUBAREA BOUNDARY
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- WATER QUALITY (WQ)
- ACCESS ROAD
- NATURAL CHANNEL
- DIVERSION STRUCTURE

SUMMARY TABLE:

Node	Area	Q	QB	QBB	∑Q	∑QB	∑QBB	DV	∑DV	Note
A	N/A	13.0			13.0			N/A	N/A	Diverision Flow
B	6.2	12.1	12.3	14.0	25.1	25.3	27.0	213	213	Subarea 107B
C	4.4	8.6	8.8	9.9	33.7	33.9	35.0		213	
D	1.5	3.7	3.8		37.4	37.5	38.8		213	Subarea 109B

NORTH

100' 50' 0 100' 200'
FEET
1" 1/2 0 1" 2"
INCHES

TRACT 53295
UNNAMED CANYON 2 EXHIBIT
ENTRADA SOUTH

FIVEPOINT

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
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26074 Avenue Hall, Suite #23 ▪ Valencia, CA 91355
FX: (661) 294-9890 ▪ PH: (661) 294-2211

DATE: 07/18/2023 REV. DATE:
PROJECT NO: 0015-035-019 SHEET 1 OF 1

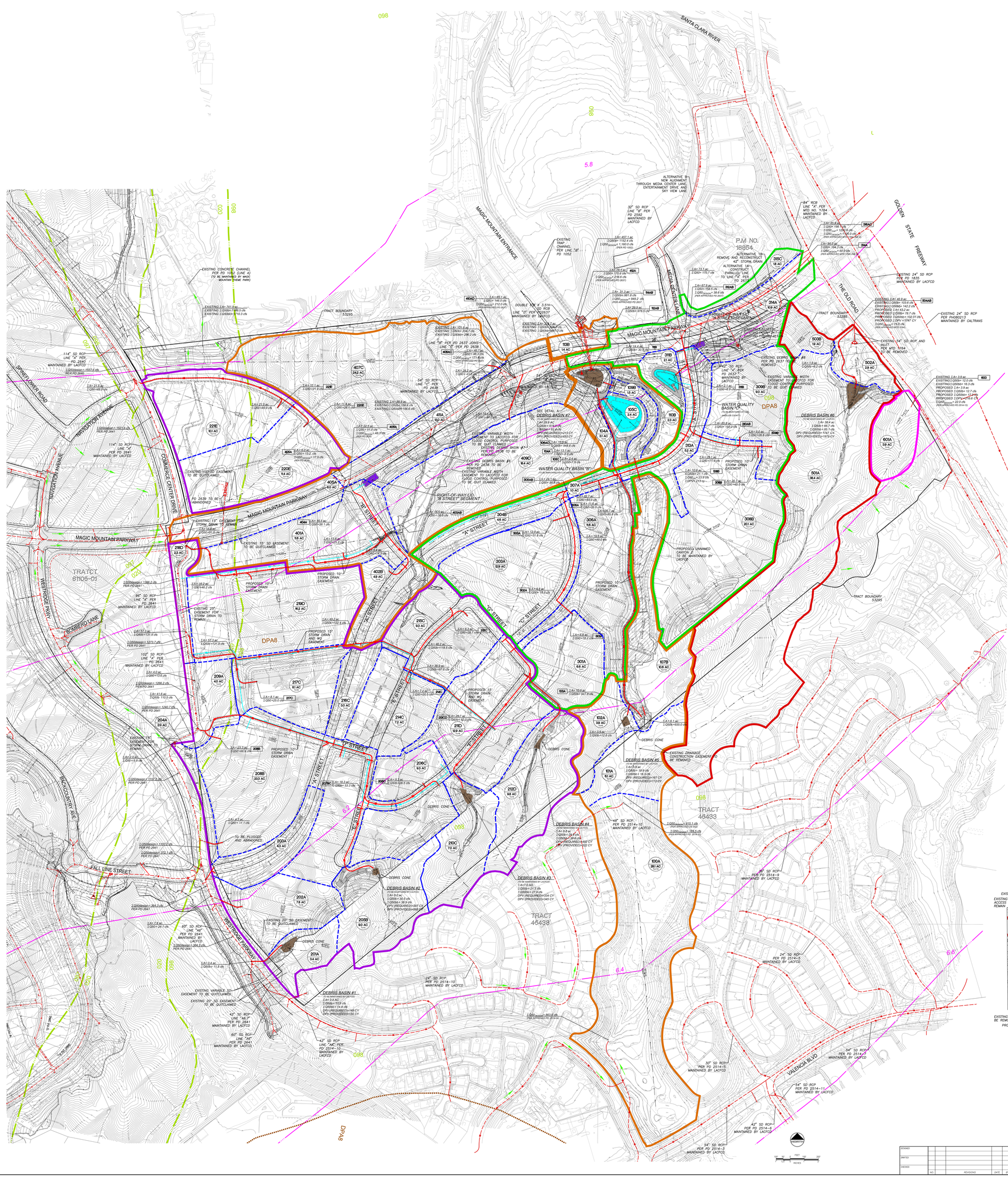
HES057-01_ENTRADA SOUTH UNNAMED CANYON 2 EXHIBIT.DWG

© Hunsaker & Associates Irvine, Inc. 2023 by Xrefs
G:\Hunsaker Projects\15200 Entrada\Storm Hydrology\HES057-01_Entrada South Unnamed Canyon 2 Exhibit.dwg Plotted on: Jul 18, 2023 by Xrefs

4 – Digital HEC-RAS Model

Electronic Files Provided Separately

5 – Drainage Concept Map (Whole Site Hydrology)


SANTA CLARA RIVER
MAGIC MOUNTAIN ENTRANCE
MAGIC MOUNTAIN PARKWAY
MEDIA CENTERLINE
GOLDEN STATE FREEWAY
THE OLD ROAD
ALTERNATIVE 1B
NEW ALIGNMENT THROUGH MEDIA CENTER LANE, ENTERTAINMENT DRIVE, AND SKY VIEW LANE
ALTERNATIVE 1B
REMOVE AND RECONSTRUCT 42" STORM DRAIN
ALTERNATIVE 1A
CONSTRUCT PARALLEL LINE TO LINE "A" PER PD 2672
P.M. NO. 18854
TRACT 45433
TRACT 53295
TRACT 61105-01
RIGHT-OF-WAY LID "B STREET" SEGMENT
WATER QUALITY BASIN "B"
WATER QUALITY BASIN "A"
DEBRIS BASIN #1
DEBRIS BASIN #2
DEBRIS BASIN #3
DEBRIS BASIN #4
DEBRIS BASIN #5
DEBRIS BASIN #6
DEBRIS BASIN #7
EXISTING DEBRIS BASIN #3 PER PD 2636 TO BE REMOVED
EXISTING DEBRIS BASIN #6 PER PD 2636 TO BE REMOVED
EXISTING DEBRIS BASIN #8 PER PD 2637 TO BE REMOVED
PROPOSED UNNAMED CANYON TO BE MAINTAINED BY LACFCD
PROPOSED 10' STORM DRAIN EASEMENT
PROPOSED 15' STORM DRAIN AND MH EASEMENT
EXISTING 24" SD RCP PER PD 1835 MAINTAINED BY LACFCD
EXISTING 54" SD, RCP, AND INLET PER MTD 1764 TO BE REMOVED
EXISTING 24" SD RCP PER PH080213 MAINTAINED BY CALTRANS
EXISTING CONCRETE CHANNEL PER PD 1052 (LINE A) (TO BE MAINTAINED BY MAGIC MOUNTAIN THEME PARK)
EXISTING TRAP CHANNEL PER LINE "B" PD 1052
32" SD. RCP LINE "B" PER PD 2592 MAINTAINED BY LACFCD
84" RCB LINE "A" PER MTD NO. 1764 MAINTAINED BY LACFCD
DOUBLE 6'W X 3.5'H SD RCB LINE "D" PER D0637 MAINTAINED BY LACFCD
54" SD RCP LINE "C" PER PD 2638 MAINTAINED BY LACFCD
114" SD RCP LINE "A" PER PD 2640 MAINTAINED BY LACFCD
114" SD RCP LINE "A" PER PD 2641 MAINTAINED BY LACFCD
96" SD RCP LINE "A" PER PD 2641 MAINTAINED BY LACFCD
102" SD RCP LINE "A" PER PD 2641 MAINTAINED BY LACFCD
60" SD RCP LINE "AE" PER PD 2641 MAINTAINED BY LACFCD
42" SD RCP LINE "AF" PER PD 2641 MAINTAINED BY LACFCD
42" SD RCP LINE "AC" PER PD 2514-10 MAINTAINED BY LACFCD
48" SD RCP PER PD 2514-10 MAINTAINED BY LACFCD
36" SD RCP PER PD 2514-9 MAINTAINED BY LACFCD
24" SD RCP PER PD 2514-10 MAINTAINED BY LACFCD
24" SD RCP PER PD 2514-5 MAINTAINED BY LACFCD
30" SD RCP PER PD 2514-5 MAINTAINED BY LACFCD
54" SD RCP PER PD 2514-5 MAINTAINED BY LACFCD
54" SD RCP PER PD 2514-11 MAINTAINED BY LACFCD
42" SD RCP PER PD 2514-6 MAINTAINED BY LACFCD
54" SD RCP PER PD 2514-3 MAINTAINED BY LACFCD
EXISTING 15" SD. EASEMENT TO BE QUITCLAIMED
EXISTING 20" SD. EASEMENT TO BE QUITCLAIMED
EXISTING VARIABLE SD. EASEMENT TO BE QUITCLAIMED
EXISTING VARIABLE WIDTH EASEMENT TO LACFCD FOR FLOOD CONTROL PURPOSES TO BE QUIT CLAIMED
EXISTING VARIABLE WIDTH EASEMENT TO LACFCD FOR FLOOD CONTROL PURPOSES TO BE QUIT CLAIMED
EXISTING 15" STORM DRAIN TO REMAIN
EXISTING 25" EASEMENT FOR STORM DRAIN TO REMAIN
EXISTING 15" SD EASEMENT TO BE QUITCLAIMED
PD 2639 TO BE ABANDONED
PROPOSED 10" STORM DRAIN EASEMENT
PROPOSED 15" STORM DRAIN AND MH EASEMENT
PROPOSED 10" STORM DRAIN EASEMENT
PROPOSED 10" STORM DRAIN EASEMENT
TO BE PLUGGED AND ABANDONED
DEBRIS CONE
DEBRIS CONE
DEBRIS CONE
DEBRIS CONE
DEBRIS CONE
DEBRIS CONE
TRACT BOUNDARY 53295
TRACT BOUNDARY 53295
TRACT BOUNDARY 53295

Appendix 5.5b

Valencia Commerce Center Drainage Concept

Hydrology and Drainage Concept Report for Valencia Commerce Center (VTPM 18108)

ESTU2022000053

VOLUME 1

County of Los Angeles

Hunsaker Project No:
0015-043-020
November 11, 2024

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Under the supervision of:

Jason H. Fukumitsu 11/12/24
Jason H. Fukumitsu Date

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1. Valencia Commerce Center VTPM 18108 – Evaluation of Conformance with LID and Hydromodification Performance Standards (Geosyntec Consultants – November 2024)

1.0 INTRODUCTION

1.1 REPORT SUMMARY

The purpose of this report is to present the Final Hydrology Design for Valencia Commerce Center (VCC) VTTM 18108. The report analyzes existing and proposed rough graded conditions for the 50 –year design storm, along with the LID requirements.

For the existing condition, a 24-Hour storm analysis based upon the Los Angeles County Modified Rational Methods of Hydrology is used for clear, burned, and bulked conditions for the watershed(s).
Volume 1 of this report is divided into several sections. Section 1 contains the introduction, and project description; Section 2 discusses the methodology used in the hydrologic analysis; Section 3 summarizes the design criteria used; Section 4 is a description of the hydrologic model, which includes brief descriptions of each watershed, and its land uses; Section 5 summarizes the analysis for LID treatment requirements; Section 6 includes the conclusions and recommendations of this report, and Section 7 includes a list of the references used in the preparation of this report; Section 8 includes the appendices for the report.

Volume 2 of this Drainage Concept Report includes the Valencia Commerce Center - Conformance with the Newhall LID Performance Standard Memorandum prepared by Geosyntec Consultants, dated August 2023.

1.2 PROJECT DESCRIPTION

The project is located in unincorporated Los Angeles County and is bounded roughly by the SR126 to the south, The Old Road to the east, Commerce Center Drive to the west, and existing improvements (PM17494).

The project site is approximately 189± acres in size, and its topography is mostly flat with a steep hillside on the Northwest of the site. The project site mostly drains south, and west to Castaic Creek. The pre-development and post-development are calculated to the limits of development.

Land use within the watershed will change over time. The ultimate development in Valencia Commerce Center will consist of industrial, commercial-business parks, and open space.

The proposed drainage system for each watershed follows the natural drainage courses. However, Post-development stormwater runoff will be larger compared to existing condition flows, for the Capital storm event. All the planning areas within the project will be exempt from hydromodification. The exemption criteria are presented in Volume 2 of this report.

2. METHODOLOGY

In the existing condition, the project site is divided into four (4) watersheds. For the proposed condition, the site is divided into four (4) separate watersheds, that cover a total of 189± acres.

Each watershed is delineated using the proposed site grading for developed areas and existing topography for undeveloped areas. The proposed drainage watersheds generally follow the natural drainage course which is described under existing conditions. Each of the main watersheds were delineated into subareas of less than 41 acres, for the hydrology analysis.

One hydrologic method is used for the drainage analysis: The Modified Rational Method is used to calculate the flow and time of concentration of each subarea. The Modified Ration Method is described in the Los Angeles County 2006 Hydrology Manual. Clear, burn, burn and bulk flow are calculated for each watershed as needed.

The time of concentration (T_c) for each subarea is computed using the Los Angeles County-approved Time of Concentration calculator (HydroCalc 1.0.3). The calculator evaluates several hydrologic parameters such as soil type, land use, imperviousness, storm frequency, length, and slope to the collection point for each subarea to calculate a time of concentration.

The undeveloped tributary areas are analyzed using a burned coefficient to calculate peak runoff rates. Unburned coefficients were used for all developed conditions, as well as undeveloped conditions for storms other than the 50-year Capital Storm event.

The project's land use, and imperviousness were determined from the Land Use and Imperviousness Table provided in the Los Angeles County Hydrology Manual. Soil types and rainfall corresponding to each subarea were obtained from the Hydrologic Maps in the Los Angeles County Hydrology Manual, Map: 1-H1-44.

3. DESIGN CRITERIA

Los Angeles County requires that several design criteria be followed when using the Rational and Modified Rational Method to determine capital flood flow.

The 50-year, and 24-hour rainfall isohyets used in the hydrologic calculations were obtained from the Los Angeles County Hydrology Manual's Hydrologic Maps. This is 5.8" for all drainage area. Other storm events were determined by factoring the 50-year isohyets.

The soil types within the project site were also determined from the hydrologic maps as 20, and 97.

For proposed conditions, 91% imperviousness is used for commercial-business park. The commercial-business park includes a mix of office, industrial, and retail. Undeveloped, open space, and bulked graded areas within the project are assumed to have around 1% and 2% imperviousness. Public streets within the project are assumed to have a 91% imperviousness.

The project falls in two main debris potential areas in the Santa Clara Basin, DPA-5 and DPA-9. The respective debris and bulking factors are: 82,000 cy / mi^2, 1.465 / mi^2; and 16,500 cy / mi^2, 1.270 / mi^2.

The design criteria used is summarized below:

Hydrology Method:	Los Angeles County Flood Control District Rational Method and Modified Rational Method.
Hydrology Modeling Software	HydroCalc 1.0.3, LAR04
Design Storm:	50-Year, 50-Year Capital (Burn and Bulk Included)
50-Year Isohyet:	5.8"
Soil Types:	20 and 97
Land Use and Imperviousness:	Undeveloped (1%) Rough graded pad (2%) Commercial-business park (91%) Open Space (2%) Public Street (91%)
Debris Potential Zone:	DPA-5 (82,000 cy / mi^2); area $\leq$ 0.1 mi^2 DPA-9 (16,500 cy / mi^2); area $\leq$ 0.1 mi^2
Peak Bulking Rate:	1.465 / mi^2; DPA-5 (area $\leq$ 0.1 mi^2) 1.270 / mi^2; DPA-9 (area $\leq$ 0.1 mi^2)

4. MODIFIED RATIONAL HYDROLOGY WATERSHEDS

The hydrology analysis was based on the Los Angeles design criteria for the Modified Rational Method. Utilizing the HydroCalc 1.0.3. to determine the Tc (Time of Concentration), and the LAR04 to compute and route the flows through the proposed storm drain system.

Drainage areas are determined, and the corresponding sub-areas delineated based on the existing topography and proposed grading for the project site.

Following is a brief description of the existing and proposed watersheds. The results of the hydrologic modeling can be found in this report on Appendix A and Appendix B.

Existing Condition

The project was delineated into four (4) existing watersheds as described below.

North of Valencia Commerce Center Watershed (Watershed 100)
Watershed 100 is a single subarea watershed located northeast of the Valencia Commerce Center. The watershed is draining southwesterly to the Castaic Creek.

South of Valencia Commerce Center Watershed (200)
Watershed 200 has 3 subareas located south of the Valencia Commerce Center. The watershed is draining northwesterly to Castaic Creek.

Middle of Valencia Commerce Center Watershed (300)
Watershed 300 has 7 subareas located at middle of the Valencia Commerce Center. The watershed is draining westerly to Hasley Creek then to Castaic Creek or directly to Castaic Creek.

West of Valencia Commerce Center Watershed (400)
Watershed 400 has 3 subareas located west of the Valencia Commerce Center. The watershed is draining easterly to Hasley Creek then to Castaic Creek. Currently there are two storm drain pipes pass through this watershed, a 48" RCP and a 102" RCP pipe recorded in PD 2298, with total flow of 1,408cfs.

Proposed Condition

In the proposed condition, the project is delineated into four (4) main watersheds:

North of Valencia Commerce Center Watershed (Watershed 100)
Similar to existing watershed 100, the proposed watershed 100 includes approximately 12-acres of industrial pads that will be draining toward to Castaic Creek. There is no offsite drainage to watershed 100.

South of Valencia Commerce Center Watershed (200)
Watershed 200 will have six tributary areas that are draining northwesterly to Castaic Creek. The western tributary area will be draining from east to west into a series of catch basins located south of the Valencia Commerce Center. The southern tributary areas will be drained by a privately maintained slope drain. There are additional four tributary areas that drain offsite. Proposed conditions for the offsite subareas can be found on the proposed drainage concept map.

Middle of Valencia Commerce Center Watershed (300)
Storm water from watershed 300 will be draining southerly and collected by catch basins to discharge to Castaic Creek directly.

West of Valencia Commerce Center Watershed (400)
The watershed 400 will be draining easterly to Hasley Creek and then to Castaic Creek. A storm drain system is proposed to collect the storm water and route the flows alongside the existing 48” RCP pipes and 102” RCP pipes and outlet into Hasley Creek.

5. LOW IMPACT DEVELOPMENT (LID) ANALYSIS

Low-impact development (LID) facilities will be designed in conformance with Los Angeles County Municipal Separate Storm Sewer System (MS4) Permit, Order No. R4-2021-0105, and Los Angeles County Department of Public Works (LACDWP) 2014 LID Ordinance. The Newhall Ranch Sub-Regional Stormwater Mitigation Plan is also used in the evaluation of this report. See attached Geosyntec LID Conformance Memo hereon in Volume II.

6. CONCLUSIONS & RECOMMENDATIONS

Based upon the hydrologic analysis performed, the developed project condition will not result in onsite or offsite impacts. There are increases in runoff, draining to Castaic Creek and Halsey Creek. The increases are mitigated by discharging to an engineered channel. The Q_{100} and Q_{CAP} values are provided for both Hasley Creek and Castaic Creek. Proposed bank lining improvements are done by Castaic Creek Bank Protection Drainage Concept Report Volume II of V (ESTU2001000012) and Revision for Hasley Creek (ESTU2023000298). Energy dissipation measures at storm drain outlets into both creeks will be implemented using grouted riprap aprons. According to these same reports, the proposed bank protection for Castaic Creek and Halsey Creek are above the capital floodplain or if need be it will be filled to be above. As stated by these reports, the adjacent sites will not be subject to flood hazards.

Privately maintained improvements are shown in appendix B (Proposed Drainage Concept Map), The LID elements for the water quality treatment will be discussed in Volume II Valencia Commerce Center VTPM 18108 Conformance.

See the summary of the results for runoff rates and debris volume in Table 1. Table 1 shows the 50-year clear runoff values and capital runoff values. Capital runoff values are either the clear, burn or burn/bulk values. For developed areas, the capital runoff is clear runoff. For natural areas without a debris basin or debris catchment area, the capital runoff is the burn/bulk runoff. For natural areas with a debris catchment area upstream of the proposed storm drain pipe, the capital runoff is the burn runoff. Detailed calculations and maps can be found in Appendix A. Watershed 100, 200, and 400 have an increase in capital flow rate compared to the existing conditions Watershed 300 has a decrease in capital flow compared to the existing conditions. Due to the increase in capital flow rate, mitigation will be done by PACE, per Castaic Creek Bank Protection Drainage Concept Report Volume II of V (ESTU2001000012) and Revision for Hasley Creek (ESTU2023000298). The mentioned bank protection improvements will be constructed prior to any developments.

Table 1- Runoff Summary

				50 year	Capital	50-year Clear Volume (ac-ft)	DV
WATERSHED 100	**Existing**		**Q (cfs)**	14.6	20.3	1.0	311.9
	Area (ac)	12.1	**q (cfs/ac)**	1.20	1.7	N/A	N/A
	Proposed		**Q (cfs)**	25.0	25.0	4.8	0
	Area (ac)	12.1	**q (cfs/ac)**	2.1	2.1	N/A	N/A
	Delta		**Q (cfs)**	10.4	4.7	3.8	311.9
	Area (ac)	0	**q (cfs/ac)**	0.9	0.4	N/A	N/A

WATERSHED 200 (ONSITE)				50 year	Capital	DV
	Existing		**Q (cfs)**	51.3	72.8	1366.2
	Area (ac)	53.0	**q (cfs/ac)**	1.0	1.4	N/A
	Proposed		**Q (cfs)**	87.9	87.9	0
	Area (ac)	49.2	**q (cfs/ac)**	1.8	1.8	N/A
	Delta		**Q (cfs)**	36.6	15.1	1366.2
	Area (ac)	3.8	**q (cfs/ac)**	0.8	0.4	N/A

WATERSHED 300				50 year	Capital	DV
	Existing		**Q (cfs)**	171.5	245.9	6984.0
	Area (ac)	92.7	**q (cfs/ac)**	1.9	2.7	N/A
	Proposed		**Q (cfs)**	178.8	187.6	1065.4
	Area (ac)	92.3	**q (cfs/ac)**	1.9	1.9	N/A
	Delta		**Q (cfs)**	7.3	58.3	5918.6
	Area (ac)	0.4	**q (cfs/ac)**	0	0.8	N/A

WATERSHED 400				50 year	Capital	DV
	Existing		**Q (cfs)**	35.1	49.4	773.9
	Area (ac)	30.0	**q (cfs/ac)**	1.2	1.6	N/A
	Proposed		**Q (cfs)**	55.7	55.7	0
	Area (ac)	30.8	**q (cfs/ac)**	1.8	1.8	N/A
	Delta		**Q (cfs)**	20.6	6.3	773.9
	Area (ac)	0.8	**q (cfs/ac)**	0.6	0.2	N/A

7. REFERENCES

i. Los Angeles County Department of Public Works Hydrology Manual, January 2006

ii. Los Angeles County Department of Public Works Sedimentation Manual, March 2006

iii. Sediment Basin design, CASQA, January 2011

iv. Approved Drainage Concept Report for Mission Village VTTM 061105, PSOMAS

APPENDIX A - Calculations

1. Existing Hydrologic Analysis (50-YR)

Peak Flow Hydrologic Analysis

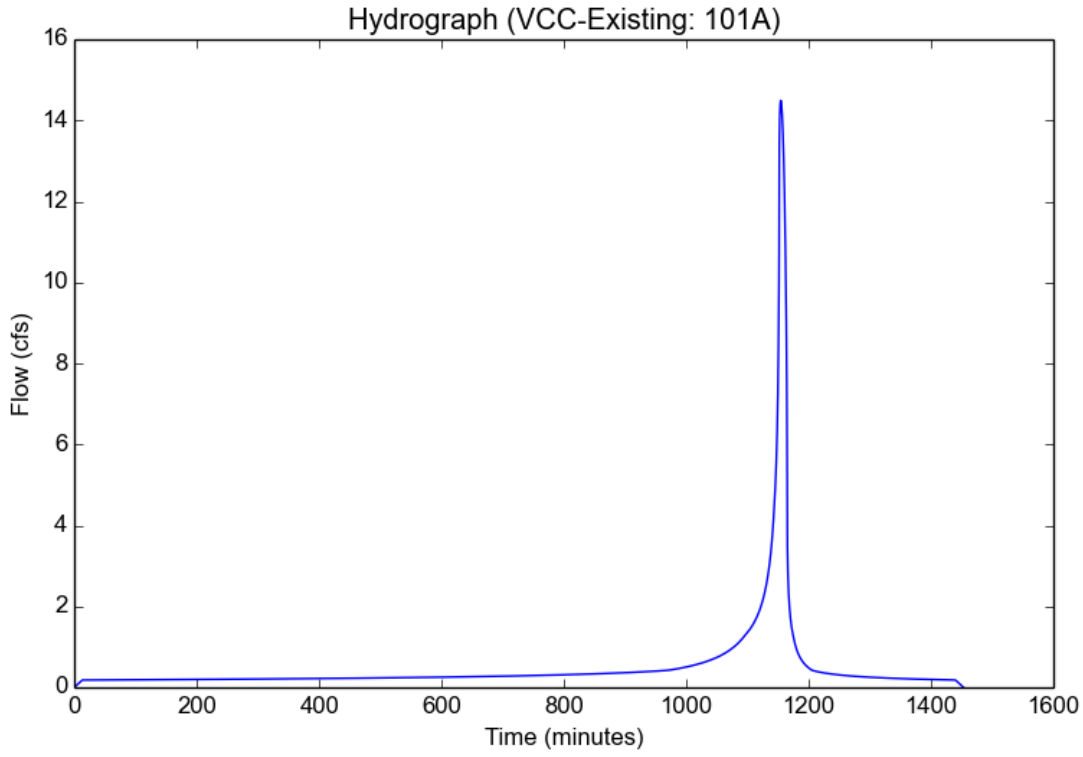
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	101A
Area (ac)	12.1
Flow Path Length (ft)	991.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.2085
Undeveloped Runoff Coefficient (Cu)	0.535
Developed Runoff Coefficient (Cd)	0.5423
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	14.4905
Burned Peak Flow Rate (cfs)	16.0524
24-Hr Clear Runoff Volume (ac-ft)	1.0312
24-Hr Clear Runoff Volume (cu-ft)	44918.0299



Peak Flow Hydrologic Analysis

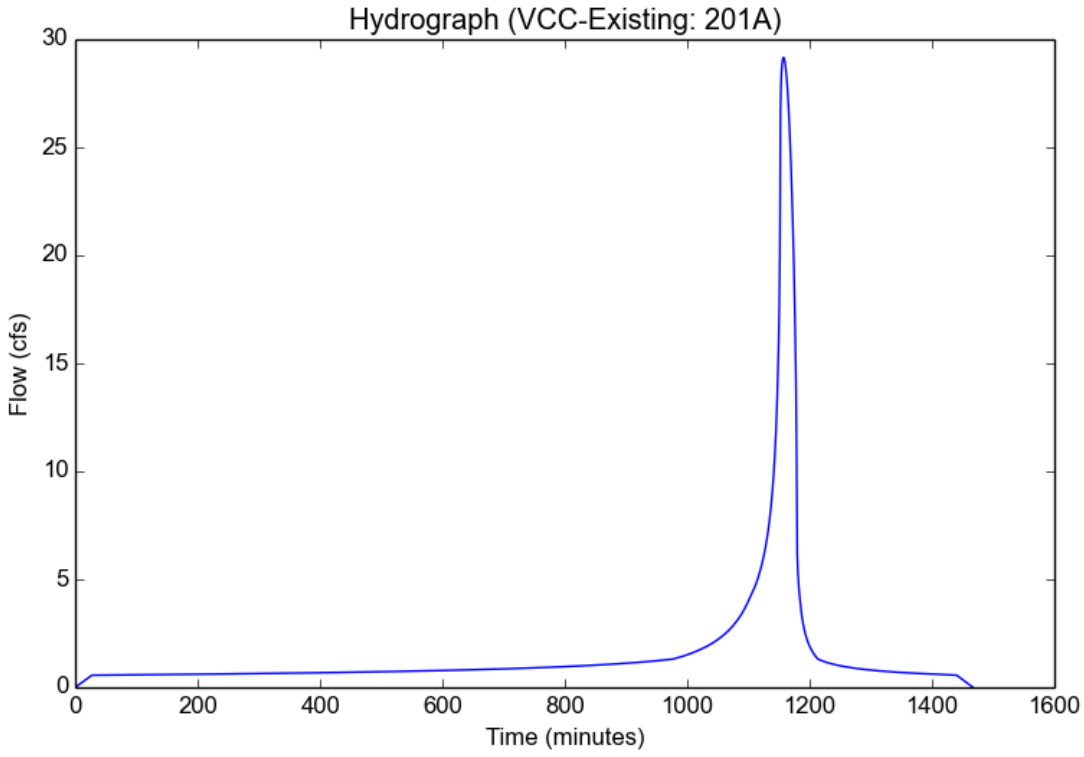
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	201A
Area (ac)	40.5
Flow Path Length (ft)	2061.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	1.5664
Undeveloped Runoff Coefficient (Cu)	0.4552
Developed Runoff Coefficient (Cd)	0.4596
Time of Concentration (min)	27.0
Clear Peak Flow Rate (cfs)	29.1576
Burned Peak Flow Rate (cfs)	33.2756
24-Hr Clear Runoff Volume (ac-ft)	3.2495
24-Hr Clear Runoff Volume (cu-ft)	141546.0943



Peak Flow Hydrologic Analysis

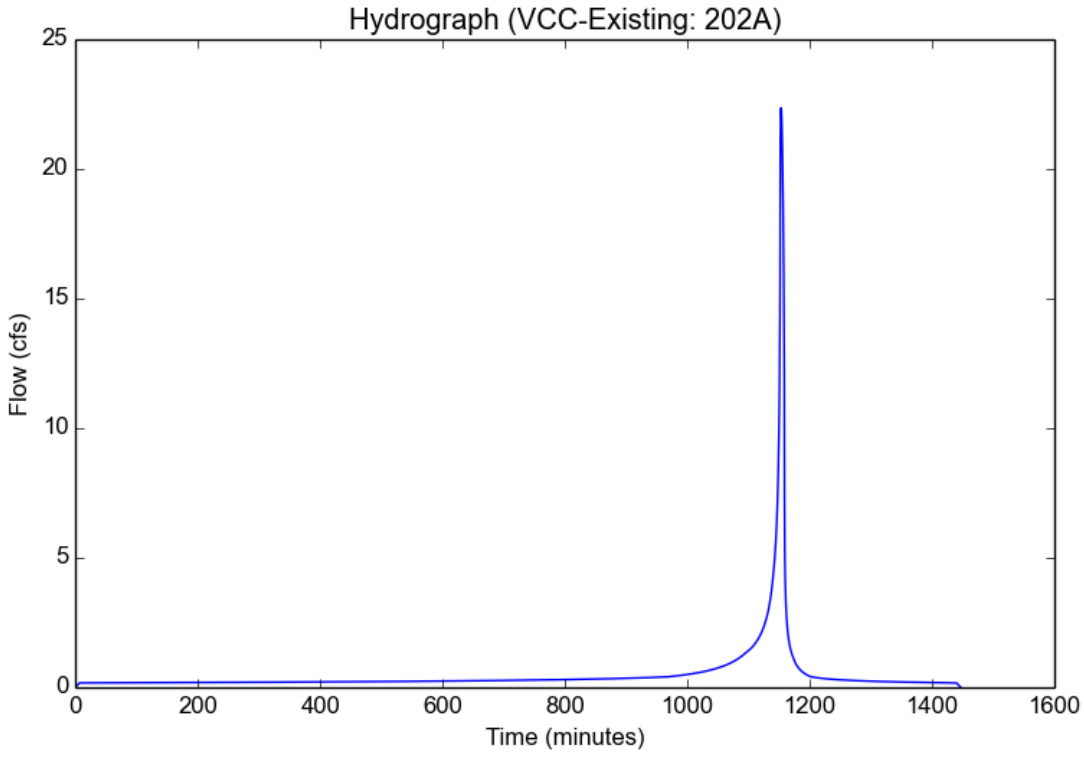
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	202A
Area (ac)	12.5
Flow Path Length (ft)	503.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.9543
Undeveloped Runoff Coefficient (Cu)	0.6024
Developed Runoff Coefficient (Cd)	0.6054
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	22.3567
Burned Peak Flow Rate (cfs)	24.3078
24-Hr Clear Runoff Volume (ac-ft)	1.0302
24-Hr Clear Runoff Volume (cu-ft)	44877.3457



Peak Flow Hydrologic Analysis

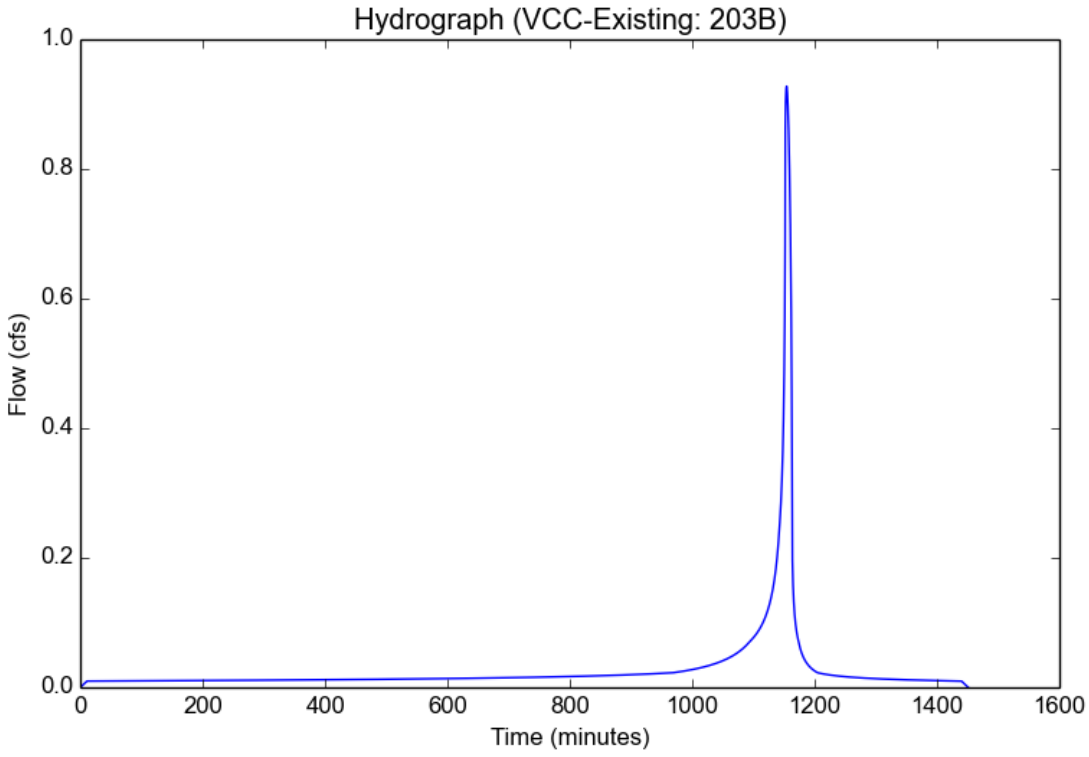
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	203B
Area (ac)	0.7
Flow Path Length (ft)	694.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.3889
Undeveloped Runoff Coefficient (Cu)	0.5513
Developed Runoff Coefficient (Cd)	0.5548
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	0.9277
Burned Peak Flow Rate (cfs)	1.024
24-Hr Clear Runoff Volume (ac-ft)	0.0573
24-Hr Clear Runoff Volume (cu-ft)	2496.6929



Peak Flow Hydrologic Analysis

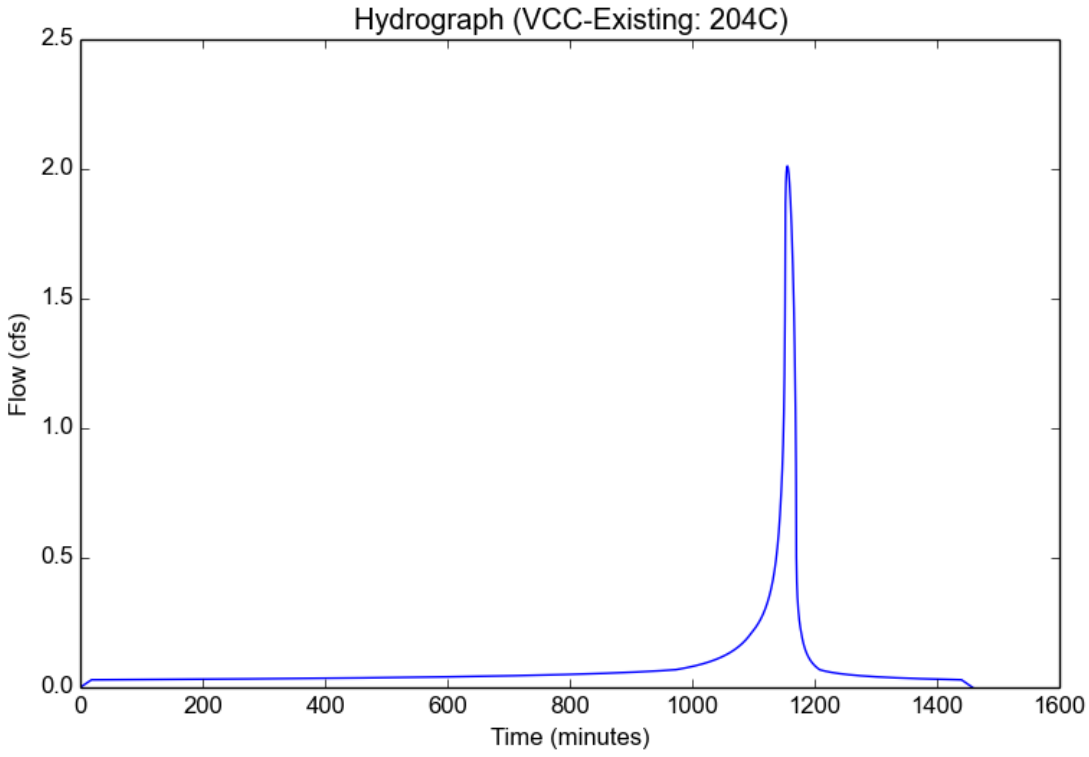
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	204C
Area (ac)	2.1
Flow Path Length (ft)	753.0
Flow Path Slope (vft/hft)	0.002
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	1.8953
Undeveloped Runoff Coefficient (Cu)	0.5014
Developed Runoff Coefficient (Cd)	0.5054
Time of Concentration (min)	18.0
Clear Peak Flow Rate (cfs)	2.0114
Burned Peak Flow Rate (cfs)	2.2562
24-Hr Clear Runoff Volume (ac-ft)	0.1704
24-Hr Clear Runoff Volume (cu-ft)	7422.333



Peak Flow Hydrologic Analysis

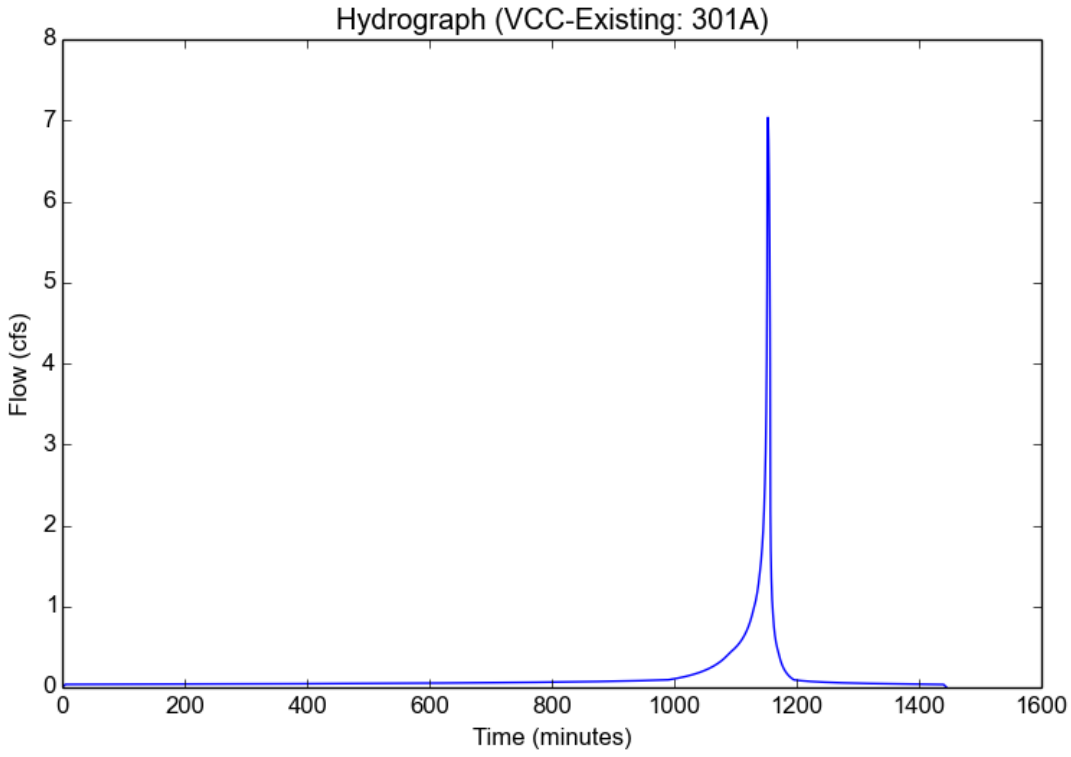
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	301A
Area (ac)	2.7
Flow Path Length (ft)	556.0
Flow Path Slope (vft/hft)	0.25
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.7516
Developed Runoff Coefficient (Cd)	0.7531
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.0364
Burned Peak Flow Rate (cfs)	7.3529
24-Hr Clear Runoff Volume (ac-ft)	0.2723
24-Hr Clear Runoff Volume (cu-ft)	11859.8351



Peak Flow Hydrologic Analysis

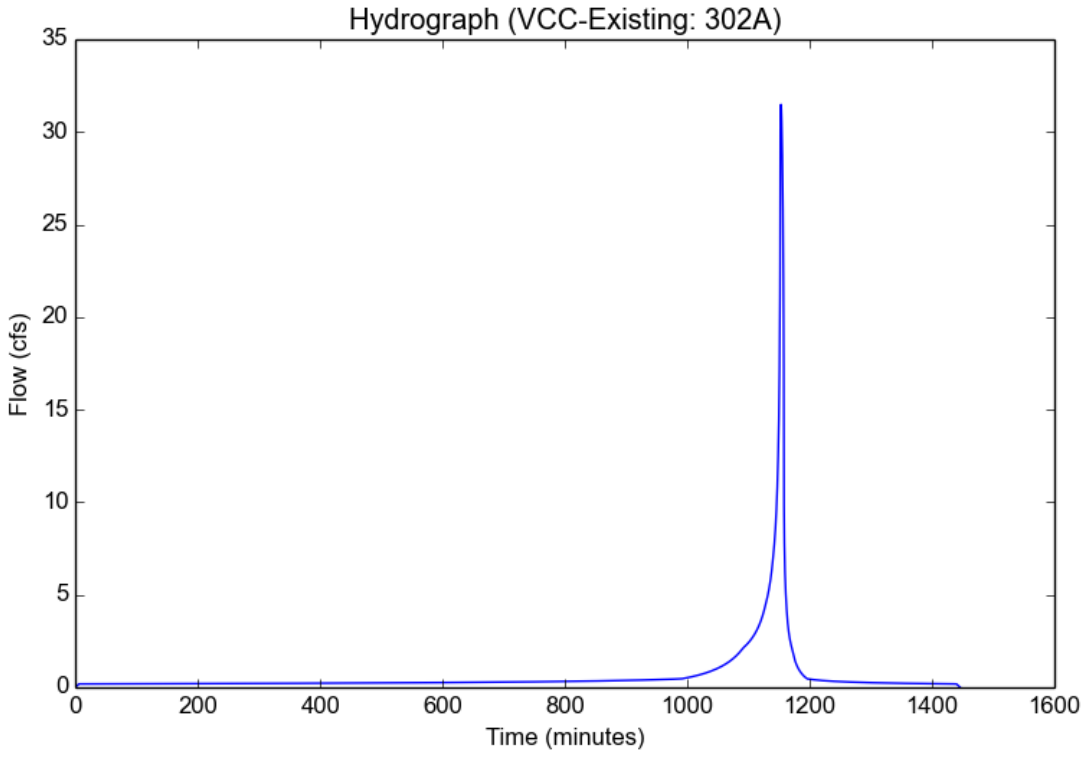
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	302A
Area (ac)	13.4
Flow Path Length (ft)	794.0
Flow Path Slope (vft/hft)	0.23
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.1763
Undeveloped Runoff Coefficient (Cu)	0.7381
Developed Runoff Coefficient (Cd)	0.7397
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	31.4849
Burned Peak Flow Rate (cfs)	32.9849
24-Hr Clear Runoff Volume (ac-ft)	1.3502
24-Hr Clear Runoff Volume (cu-ft)	58815.3649



Peak Flow Hydrologic Analysis

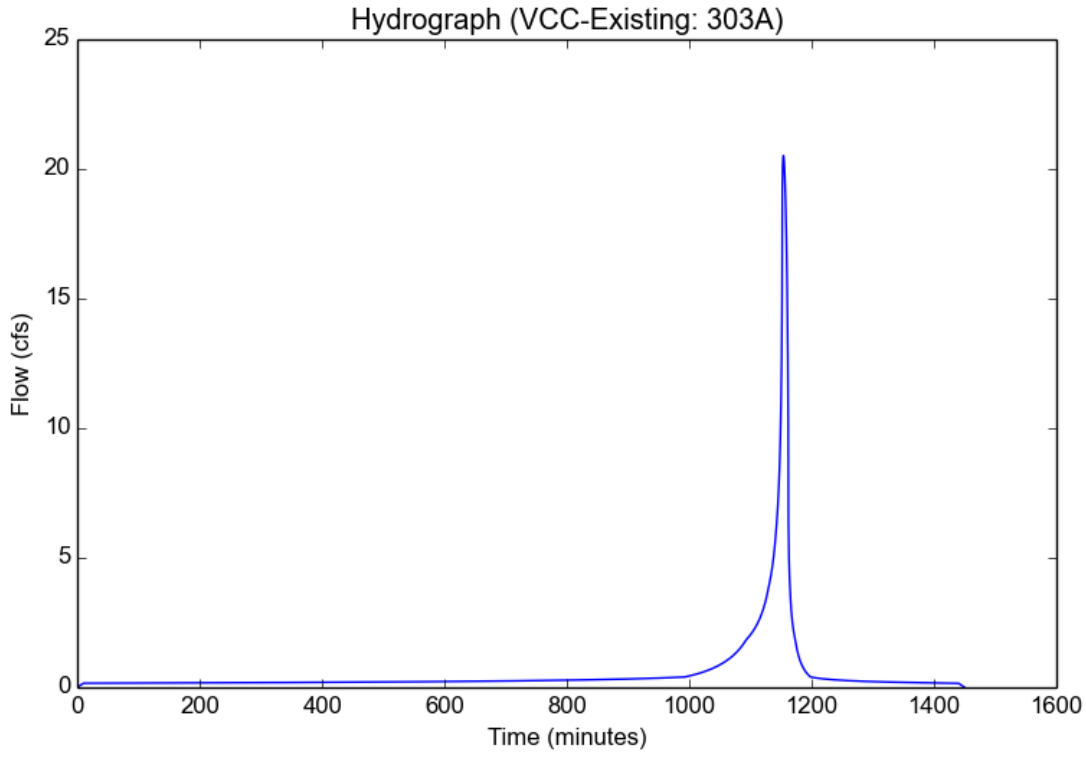
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	303A
Area (ac)	11.6
Flow Path Length (ft)	1449.0
Flow Path Slope (vft/hft)	0.13
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.4983
Undeveloped Runoff Coefficient (Cu)	0.7059
Developed Runoff Coefficient (Cd)	0.7078
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	20.5132
Burned Peak Flow Rate (cfs)	21.6169
24-Hr Clear Runoff Volume (ac-ft)	1.1667
24-Hr Clear Runoff Volume (cu-ft)	50823.1746



Peak Flow Hydrologic Analysis

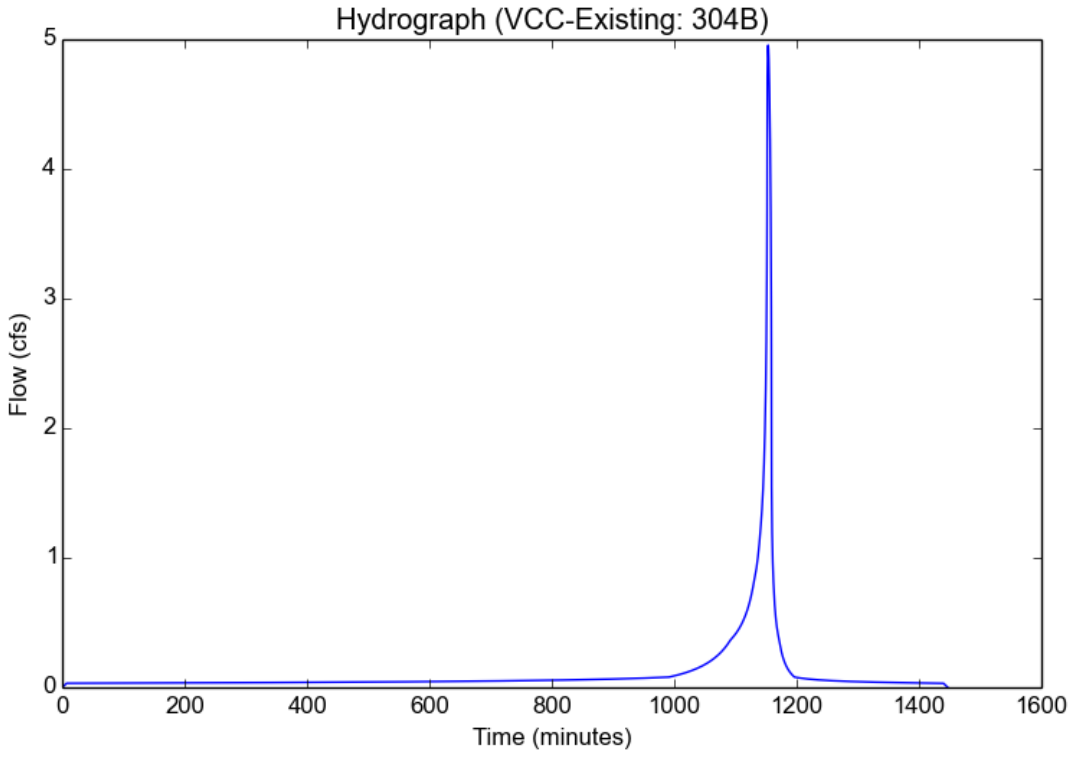
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	304B
Area (ac)	2.3
Flow Path Length (ft)	692.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.9543
Undeveloped Runoff Coefficient (Cu)	0.7276
Developed Runoff Coefficient (Cd)	0.7293
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	4.9555
Burned Peak Flow Rate (cfs)	5.2018
24-Hr Clear Runoff Volume (ac-ft)	0.2316
24-Hr Clear Runoff Volume (cu-ft)	10089.5648



Peak Flow Hydrologic Analysis

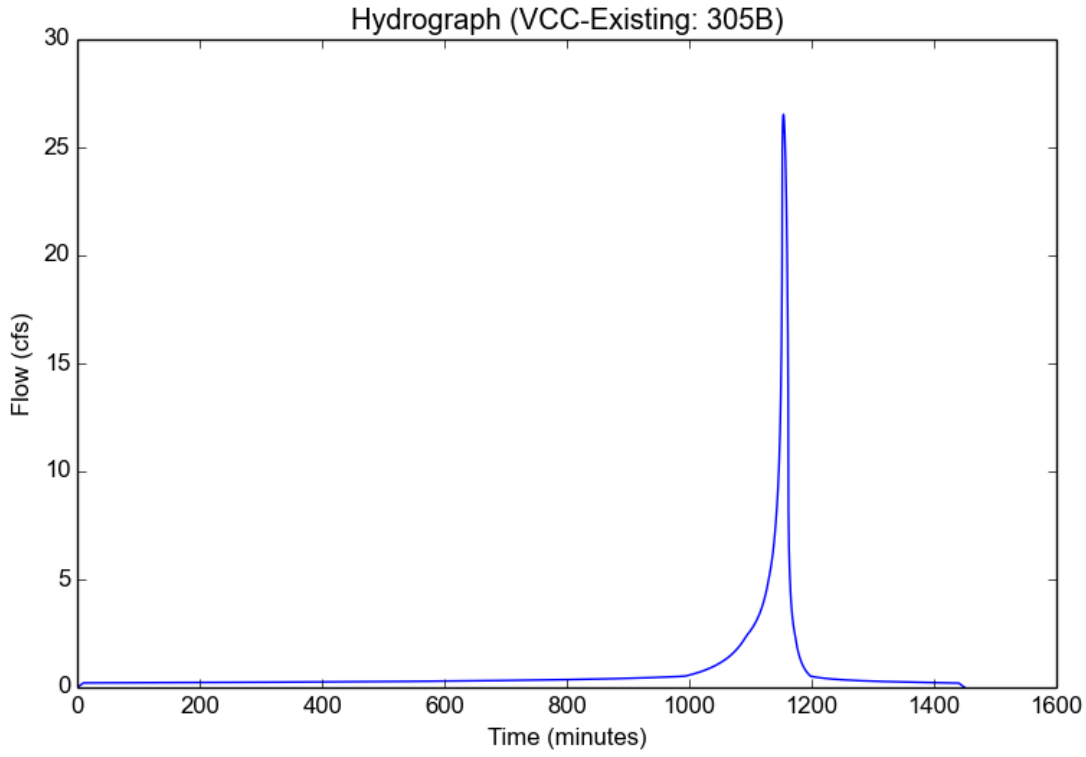
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	305B
Area (ac)	15.0
Flow Path Length (ft)	1368.0
Flow Path Slope (vft/hft)	0.15
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.4983
Undeveloped Runoff Coefficient (Cu)	0.7059
Developed Runoff Coefficient (Cd)	0.7078
Time of Concentration (min)	10.0
Clear Peak Flow Rate (cfs)	26.5257
Burned Peak Flow Rate (cfs)	27.9529
24-Hr Clear Runoff Volume (ac-ft)	1.5087
24-Hr Clear Runoff Volume (cu-ft)	65719.6223



Peak Flow Hydrologic Analysis

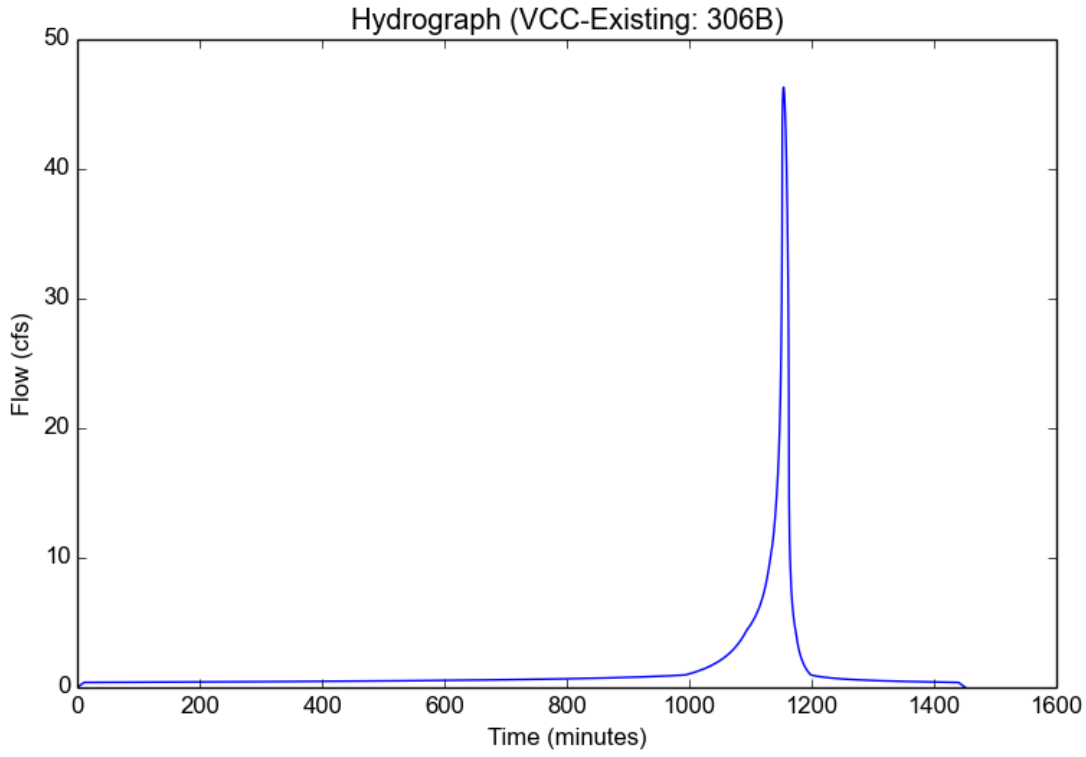
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	306B
Area (ac)	27.7
Flow Path Length (ft)	1502.0
Flow Path Slope (vft/hft)	0.13
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.3889
Undeveloped Runoff Coefficient (Cu)	0.6977
Developed Runoff Coefficient (Cd)	0.6997
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	46.3011
Burned Peak Flow Rate (cfs)	48.872
24-Hr Clear Runoff Volume (ac-ft)	2.7841
24-Hr Clear Runoff Volume (cu-ft)	121277.3583



Peak Flow Hydrologic Analysis

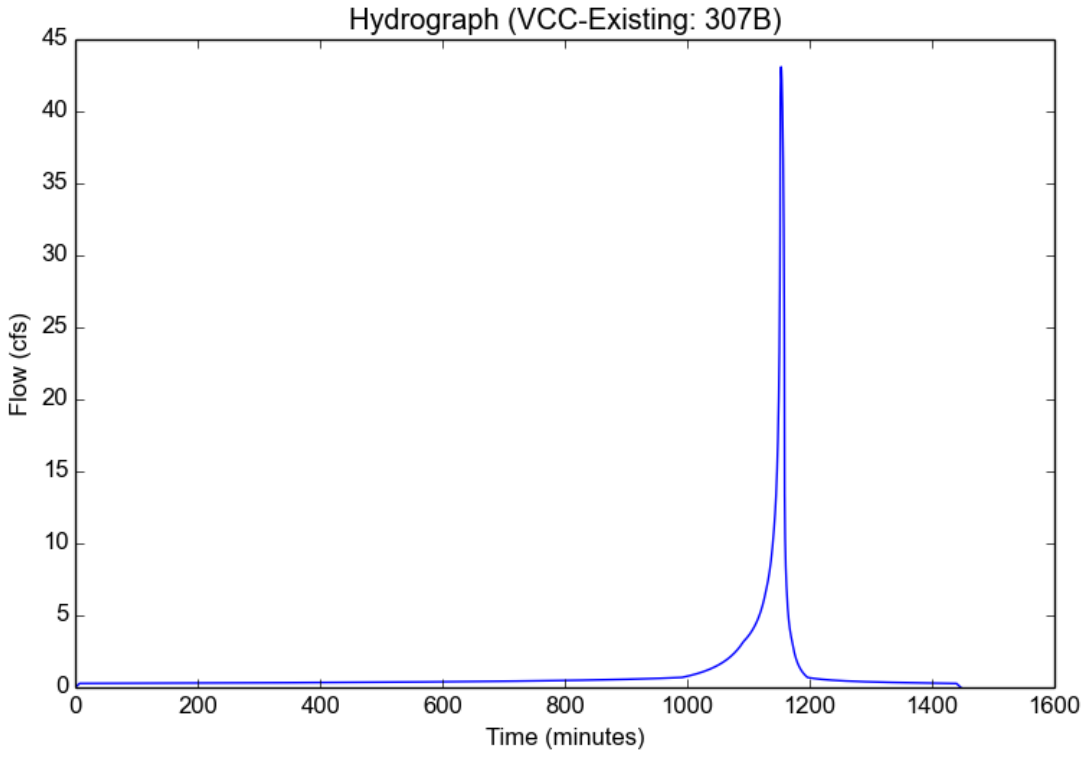
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	307B
Area (ac)	20.0
Flow Path Length (ft)	705.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.9543
Undeveloped Runoff Coefficient (Cu)	0.7276
Developed Runoff Coefficient (Cd)	0.7293
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	43.0916
Burned Peak Flow Rate (cfs)	45.2332
24-Hr Clear Runoff Volume (ac-ft)	2.0141
24-Hr Clear Runoff Volume (cu-ft)	87735.3463



Peak Flow Hydrologic Analysis

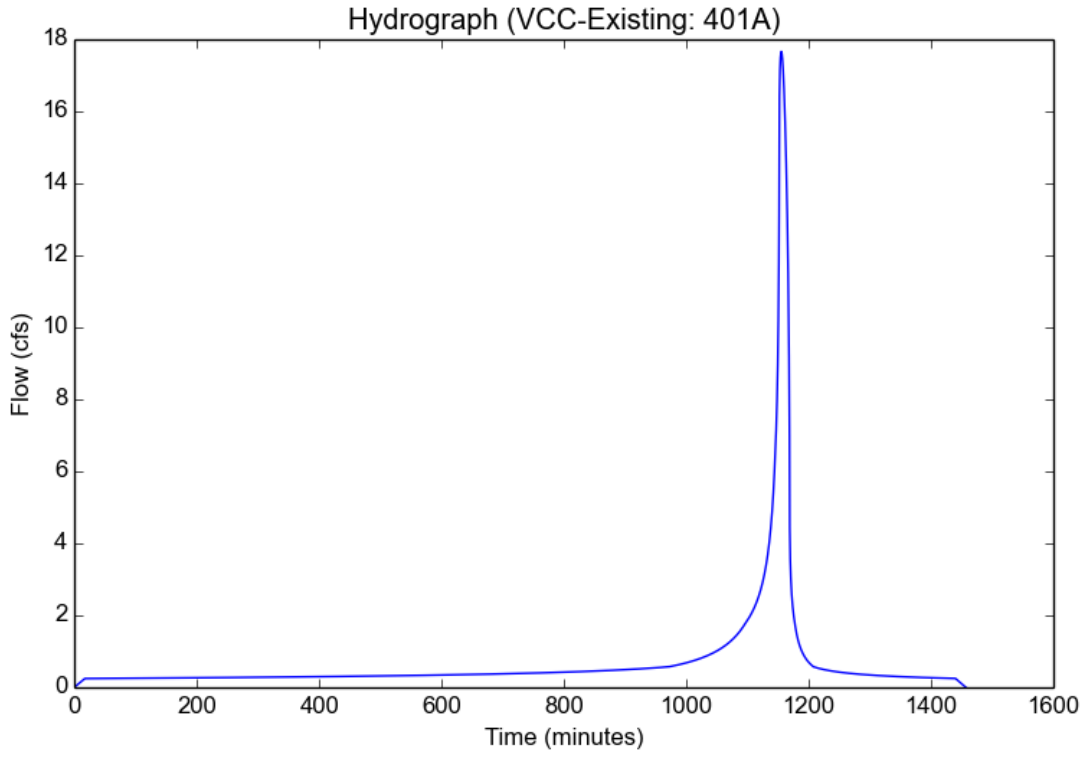
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	401A
Area (ac)	17.7
Flow Path Length (ft)	1602.0
Flow Path Slope (vft/hft)	0.04
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	1.9469
Undeveloped Runoff Coefficient (Cu)	0.5086
Developed Runoff Coefficient (Cd)	0.5125
Time of Concentration (min)	17.0
Clear Peak Flow Rate (cfs)	17.6618
Burned Peak Flow Rate (cfs)	19.7606
24-Hr Clear Runoff Volume (ac-ft)	1.4384
24-Hr Clear Runoff Volume (cu-ft)	62655.4781



Peak Flow Hydrologic Analysis

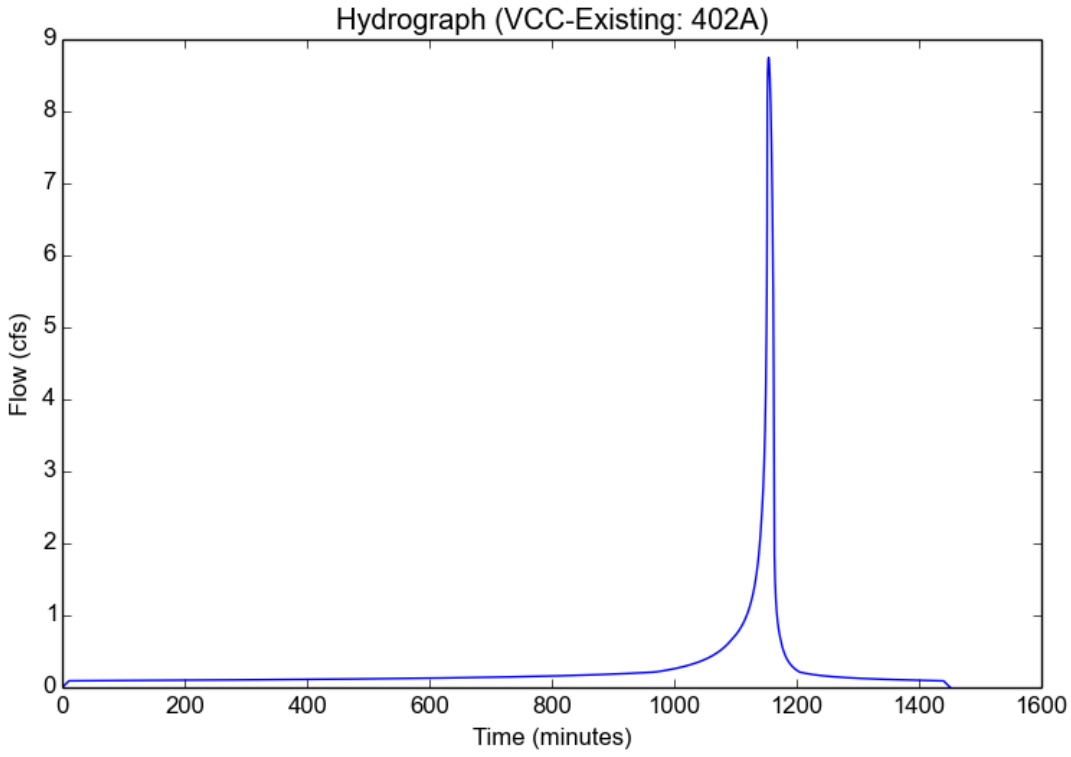
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	402A
Area (ac)	6.6
Flow Path Length (ft)	882.0
Flow Path Slope (vft/hft)	0.04
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.3889
Undeveloped Runoff Coefficient (Cu)	0.5513
Developed Runoff Coefficient (Cd)	0.5548
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	8.7467
Burned Peak Flow Rate (cfs)	9.6549
24-Hr Clear Runoff Volume (ac-ft)	0.5404
24-Hr Clear Runoff Volume (cu-ft)	23540.2478



Peak Flow Hydrologic Analysis

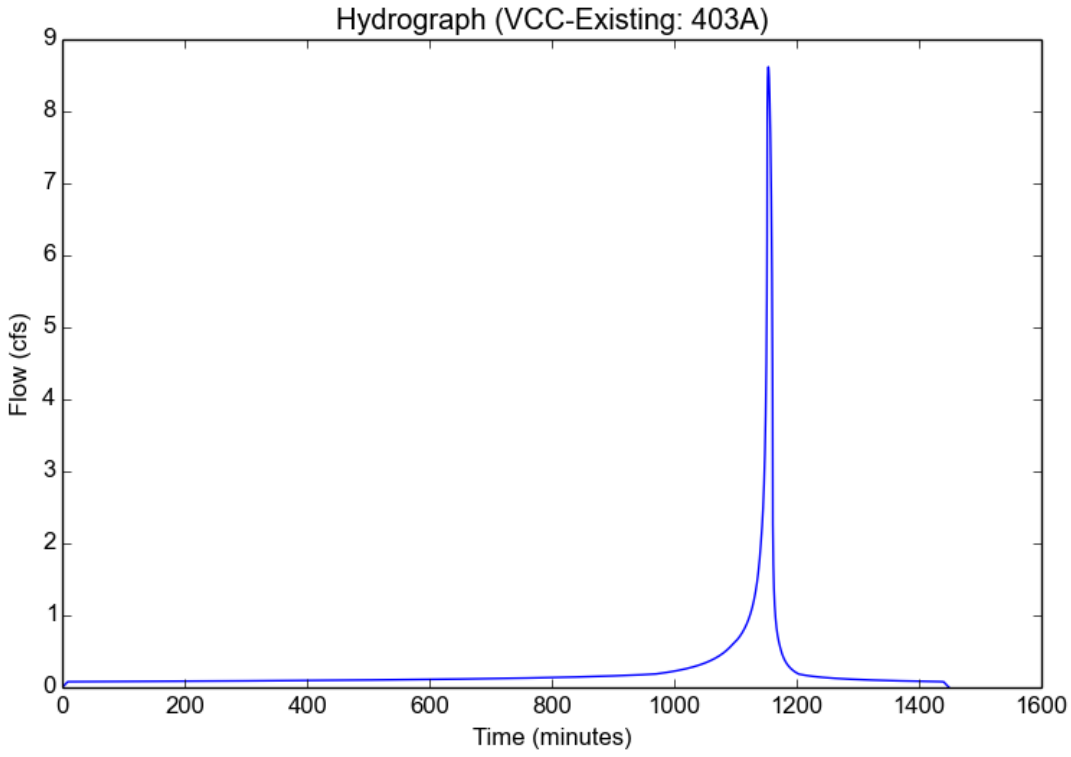
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Existing/VCC-Existing Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Existing
Subarea ID	403A
Area (ac)	5.7
Flow Path Length (ft)	727.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.6251
Undeveloped Runoff Coefficient (Cu)	0.5727
Developed Runoff Coefficient (Cd)	0.5759
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	8.6178
Burned Peak Flow Rate (cfs)	9.4516
24-Hr Clear Runoff Volume (ac-ft)	0.468
24-Hr Clear Runoff Volume (cu-ft)	20387.7691



2. Proposed Hydrologic Analysis (-YR)

Peak Flow Hydrologic Analysis

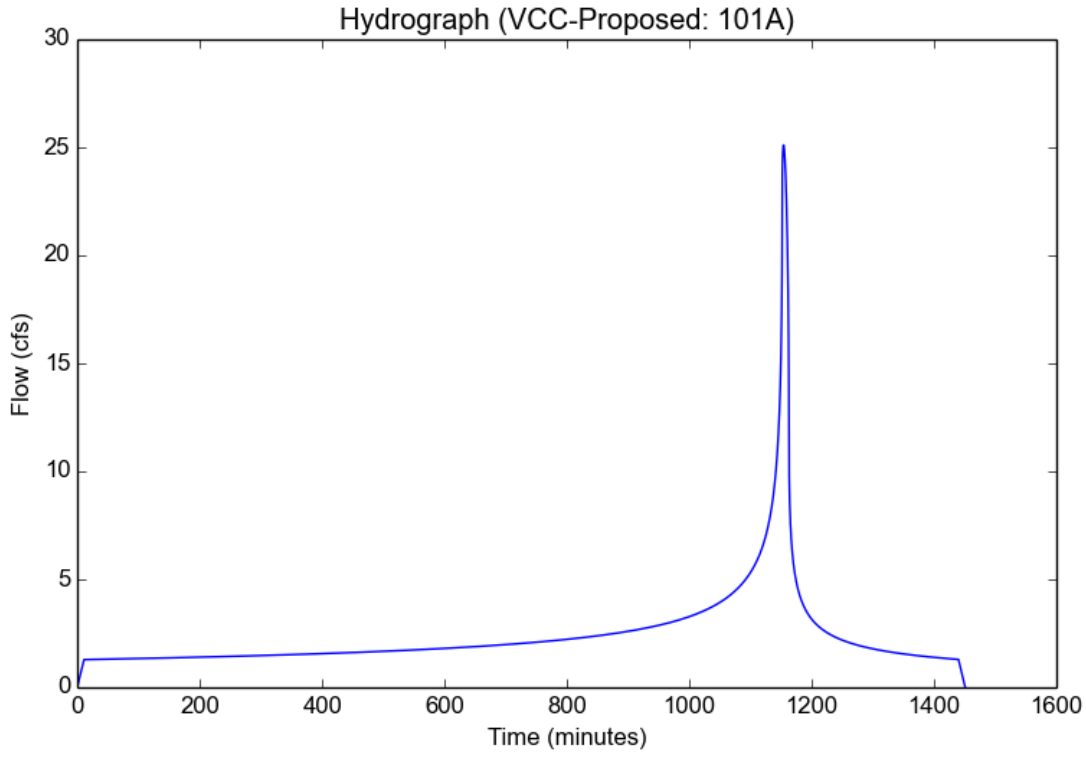
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	101A
Area (ac)	12.1
Flow Path Length (ft)	1110.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.3889
Undeveloped Runoff Coefficient (Cu)	0.5513
Developed Runoff Coefficient (Cd)	0.8686
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	25.1076
Burned Peak Flow Rate (cfs)	25.1076
24-Hr Clear Runoff Volume (ac-ft)	4.8355
24-Hr Clear Runoff Volume (cu-ft)	210635.6897



Peak Flow Hydrologic Analysis

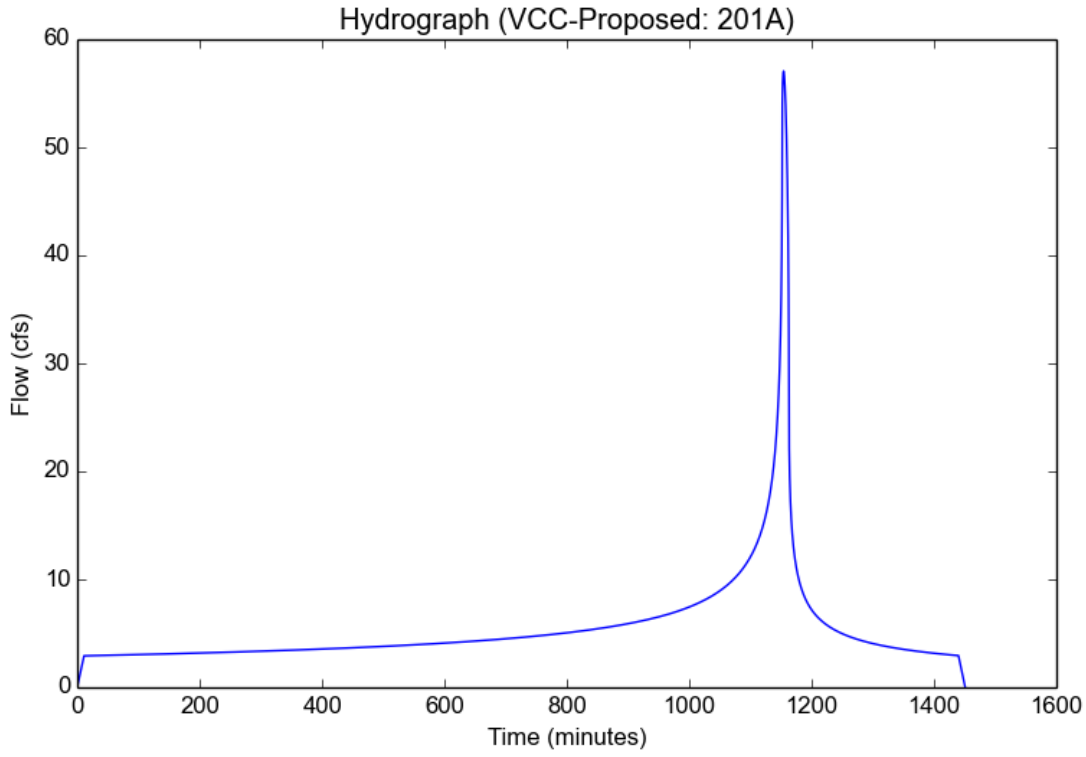
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	201A
Area (ac)	27.5
Flow Path Length (ft)	1200.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.3889
Undeveloped Runoff Coefficient (Cu)	0.5513
Developed Runoff Coefficient (Cd)	0.8686
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	57.0627
Burned Peak Flow Rate (cfs)	57.0627
24-Hr Clear Runoff Volume (ac-ft)	10.9898
24-Hr Clear Runoff Volume (cu-ft)	478717.4767



Peak Flow Hydrologic Analysis

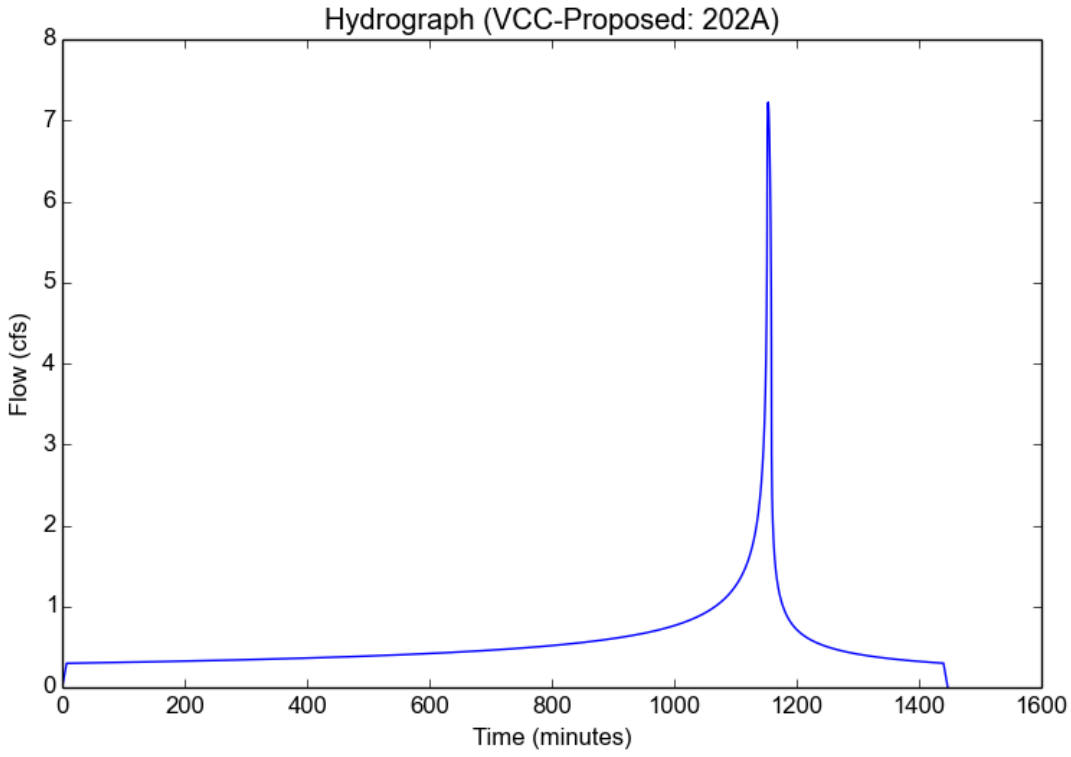
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	202A
Area (ac)	2.8
Flow Path Length (ft)	565.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.9543
Undeveloped Runoff Coefficient (Cu)	0.6024
Developed Runoff Coefficient (Cd)	0.8732
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	7.2232
Burned Peak Flow Rate (cfs)	7.2232
24-Hr Clear Runoff Volume (ac-ft)	1.1191
24-Hr Clear Runoff Volume (cu-ft)	48748.0772



Peak Flow Hydrologic Analysis

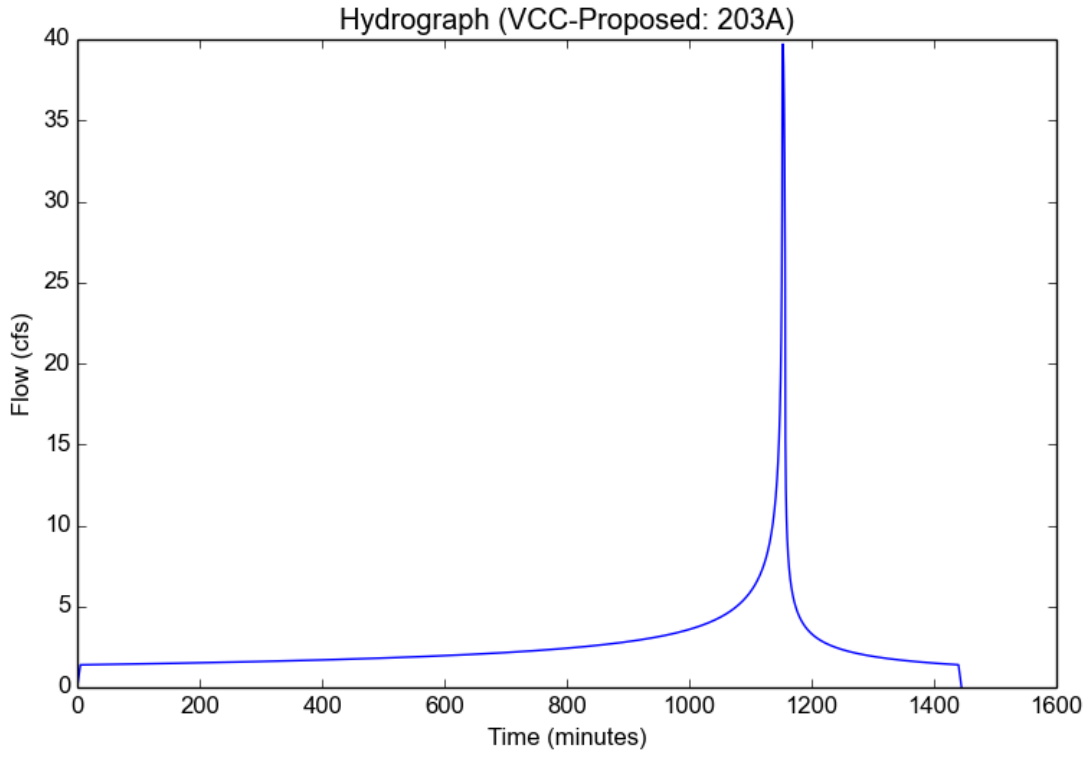
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	203A
Area (ac)	13.1
Flow Path Length (ft)	310.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.6321
Developed Runoff Coefficient (Cd)	0.8759
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	39.7055
Burned Peak Flow Rate (cfs)	39.7055
24-Hr Clear Runoff Volume (ac-ft)	5.2361
24-Hr Clear Runoff Volume (cu-ft)	228084.974



Peak Flow Hydrologic Analysis

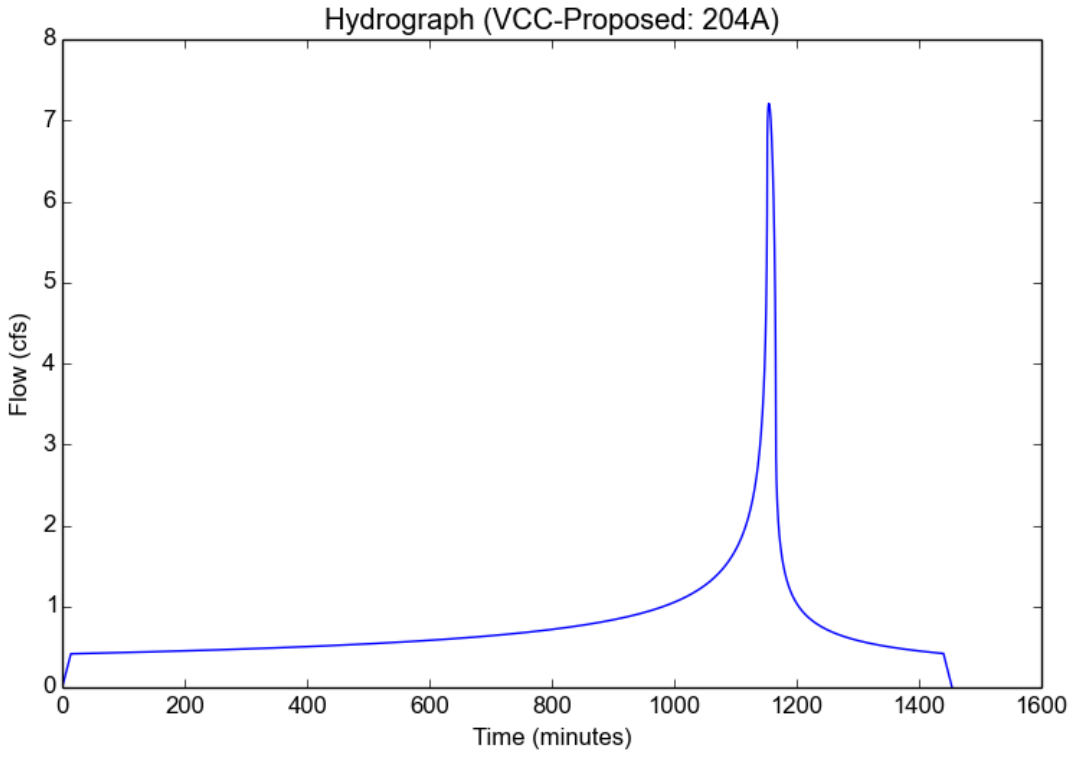
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	204A
Area (ac)	3.9
Flow Path Length (ft)	1392.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.1329
Undeveloped Runoff Coefficient (Cu)	0.5281
Developed Runoff Coefficient (Cd)	0.8665
Time of Concentration (min)	14.0
Clear Peak Flow Rate (cfs)	7.208
Burned Peak Flow Rate (cfs)	7.208
24-Hr Clear Runoff Volume (ac-ft)	1.5585
24-Hr Clear Runoff Volume (cu-ft)	67886.5463



Peak Flow Hydrologic Analysis

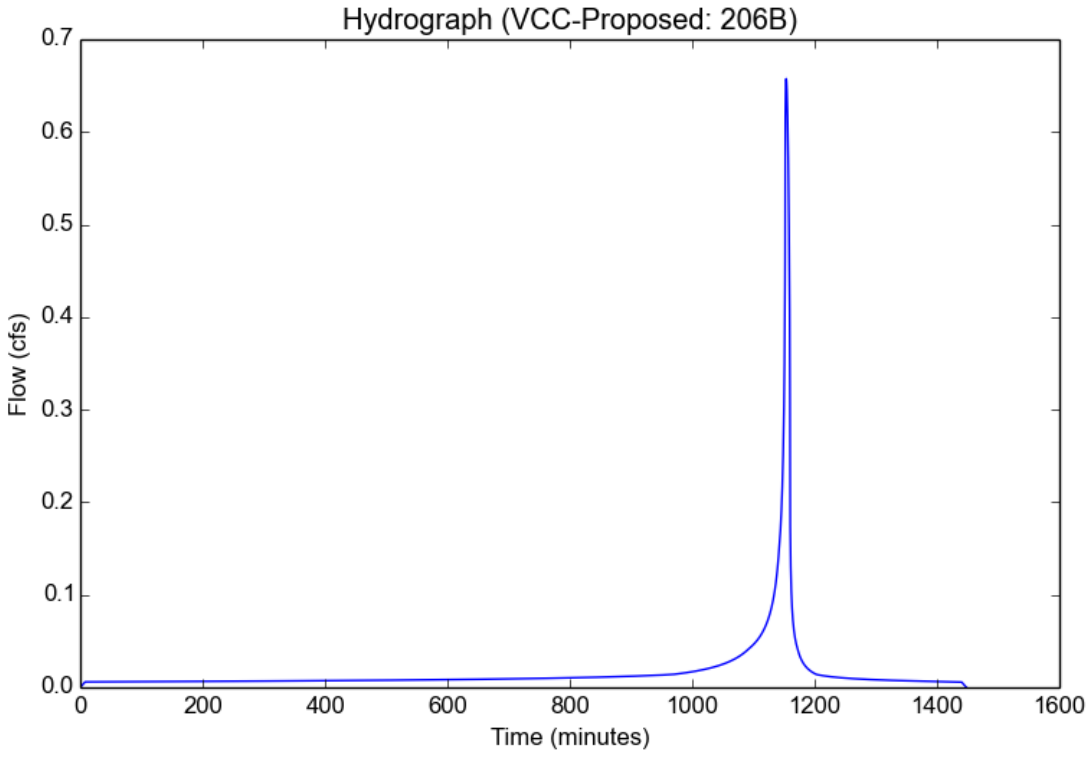
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	206B
Area (ac)	0.4
Flow Path Length (ft)	405.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.7746
Undeveloped Runoff Coefficient (Cu)	0.5862
Developed Runoff Coefficient (Cd)	0.5924
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	0.6575
Burned Peak Flow Rate (cfs)	0.6575
24-Hr Clear Runoff Volume (ac-ft)	0.0343
24-Hr Clear Runoff Volume (cu-ft)	1494.6233



Peak Flow Hydrologic Analysis

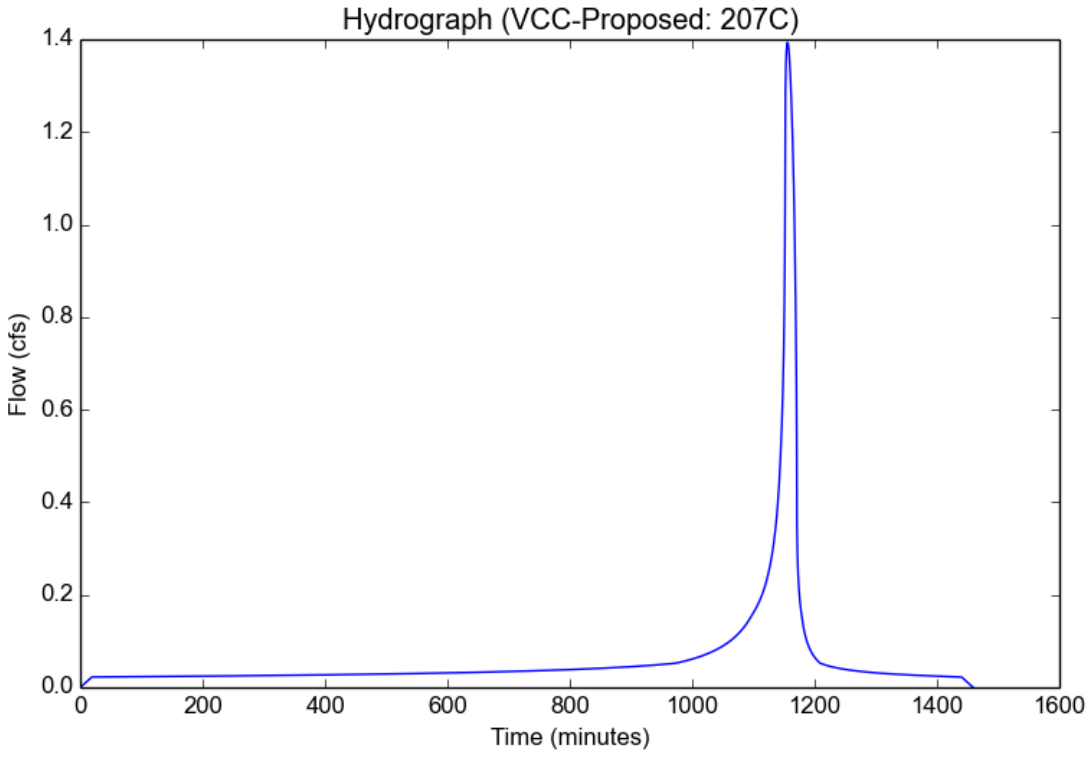
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	207C
Area (ac)	1.5
Flow Path Length (ft)	1281.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	1.8477
Undeveloped Runoff Coefficient (Cu)	0.4947
Developed Runoff Coefficient (Cd)	0.5028
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	1.3935
Burned Peak Flow Rate (cfs)	1.3935
24-Hr Clear Runoff Volume (ac-ft)	0.1268
24-Hr Clear Runoff Volume (cu-ft)	5525.2624



Peak Flow Hydrologic Analysis

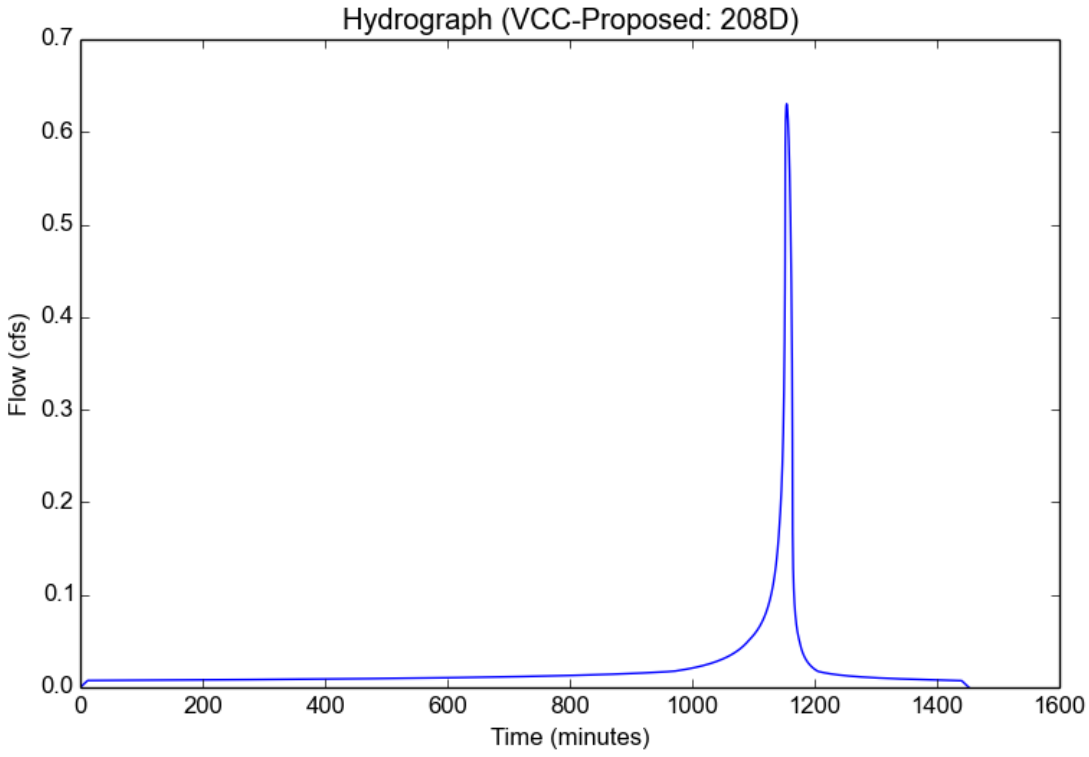
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	208D
Area (ac)	0.5
Flow Path Length (ft)	802.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.2931
Undeveloped Runoff Coefficient (Cu)	0.5426
Developed Runoff Coefficient (Cd)	0.5498
Time of Concentration (min)	12.0
Clear Peak Flow Rate (cfs)	0.6303
Burned Peak Flow Rate (cfs)	0.6303
24-Hr Clear Runoff Volume (ac-ft)	0.0427
24-Hr Clear Runoff Volume (cu-ft)	1858.1085



Peak Flow Hydrologic Analysis

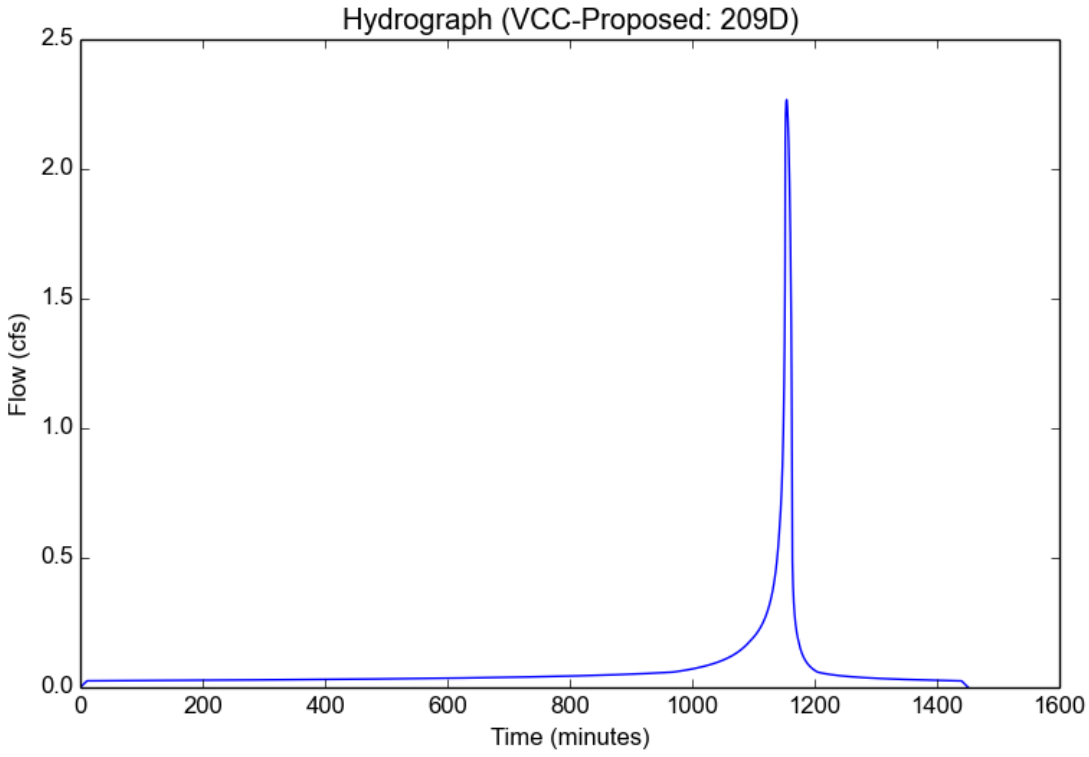
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	209D
Area (ac)	1.7
Flow Path Length (ft)	578.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.3889
Undeveloped Runoff Coefficient (Cu)	0.5513
Developed Runoff Coefficient (Cd)	0.5582
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	2.2671
Burned Peak Flow Rate (cfs)	2.4992
24-Hr Clear Runoff Volume (ac-ft)	0.1452
24-Hr Clear Runoff Volume (cu-ft)	6324.8421



Peak Flow Hydrologic Analysis

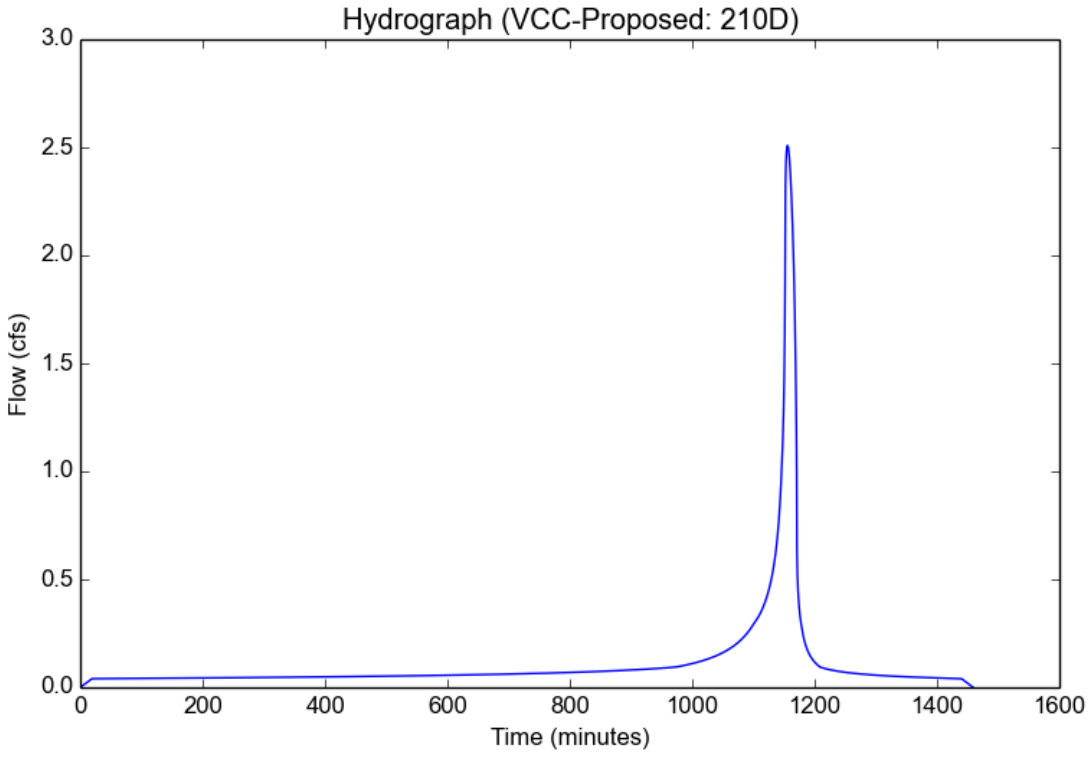
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	210D
Area (ac)	2.7
Flow Path Length (ft)	1279.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	1.8477
Undeveloped Runoff Coefficient (Cu)	0.4947
Developed Runoff Coefficient (Cd)	0.5028
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	2.5084
Burned Peak Flow Rate (cfs)	2.5084
24-Hr Clear Runoff Volume (ac-ft)	0.2283
24-Hr Clear Runoff Volume (cu-ft)	9945.4723



Peak Flow Hydrologic Analysis

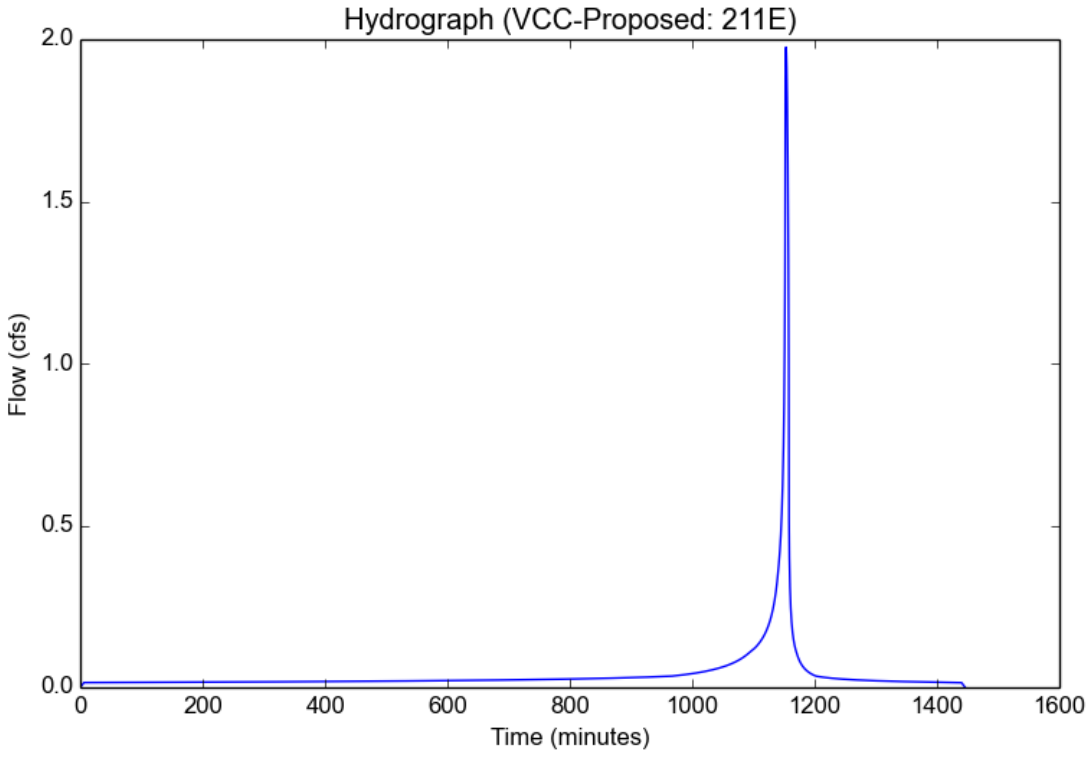
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	211E
Area (ac)	1.0
Flow Path Length (ft)	455.0
Flow Path Slope (vft/hft)	0.05
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.1763
Undeveloped Runoff Coefficient (Cu)	0.6163
Developed Runoff Coefficient (Cd)	0.622
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	1.9757
Burned Peak Flow Rate (cfs)	1.9757
24-Hr Clear Runoff Volume (ac-ft)	0.0861
24-Hr Clear Runoff Volume (cu-ft)	3750.0967



Peak Flow Hydrologic Analysis

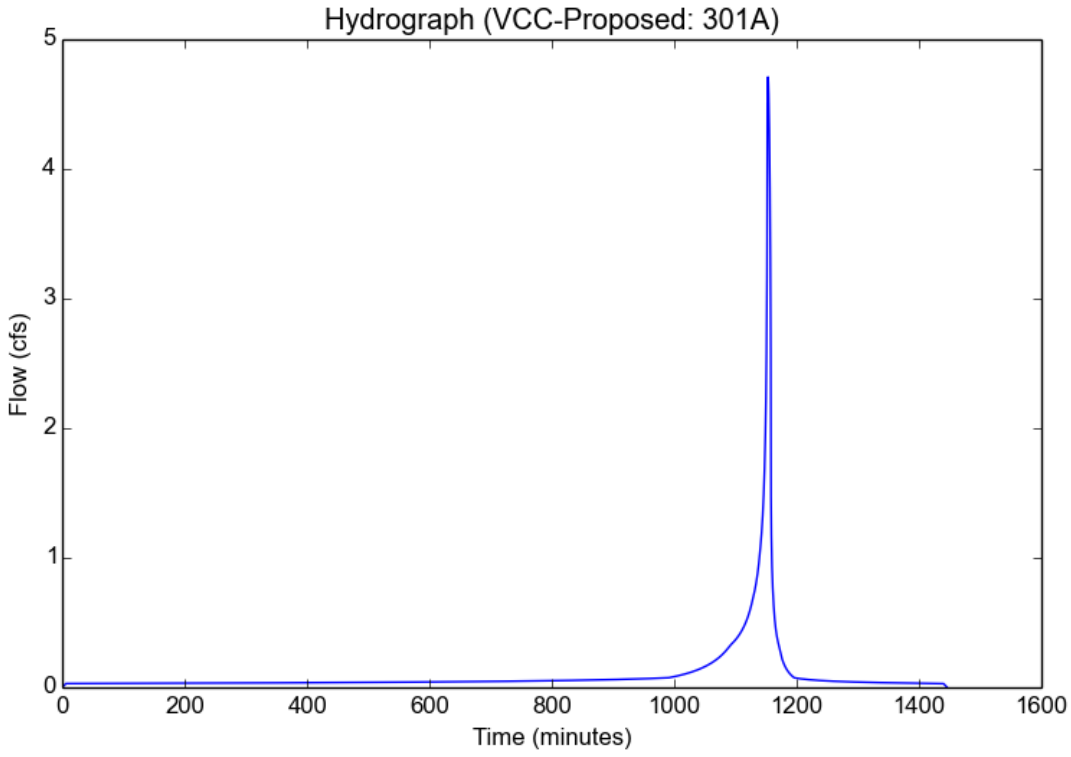
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	301A
Area (ac)	2.0
Flow Path Length (ft)	549.0
Flow Path Slope (vft/hft)	0.09
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.1763
Undeveloped Runoff Coefficient (Cu)	0.7381
Developed Runoff Coefficient (Cd)	0.7414
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	4.7095
Burned Peak Flow Rate (cfs)	4.7095
24-Hr Clear Runoff Volume (ac-ft)	0.2082
24-Hr Clear Runoff Volume (cu-ft)	9069.3784



Peak Flow Hydrologic Analysis

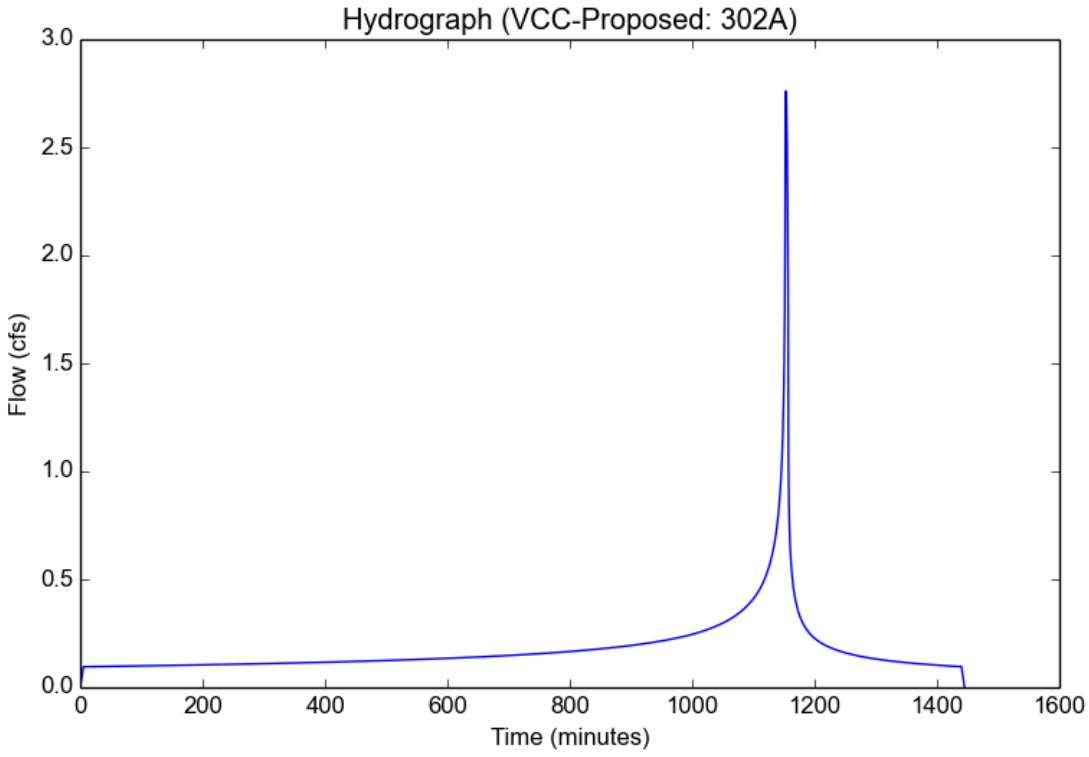
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	302A
Area (ac)	0.9
Flow Path Length (ft)	157.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.7516
Developed Runoff Coefficient (Cd)	0.8866
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	2.7614
Burned Peak Flow Rate (cfs)	2.7614
24-Hr Clear Runoff Volume (ac-ft)	0.3612
24-Hr Clear Runoff Volume (cu-ft)	15734.6665



Peak Flow Hydrologic Analysis

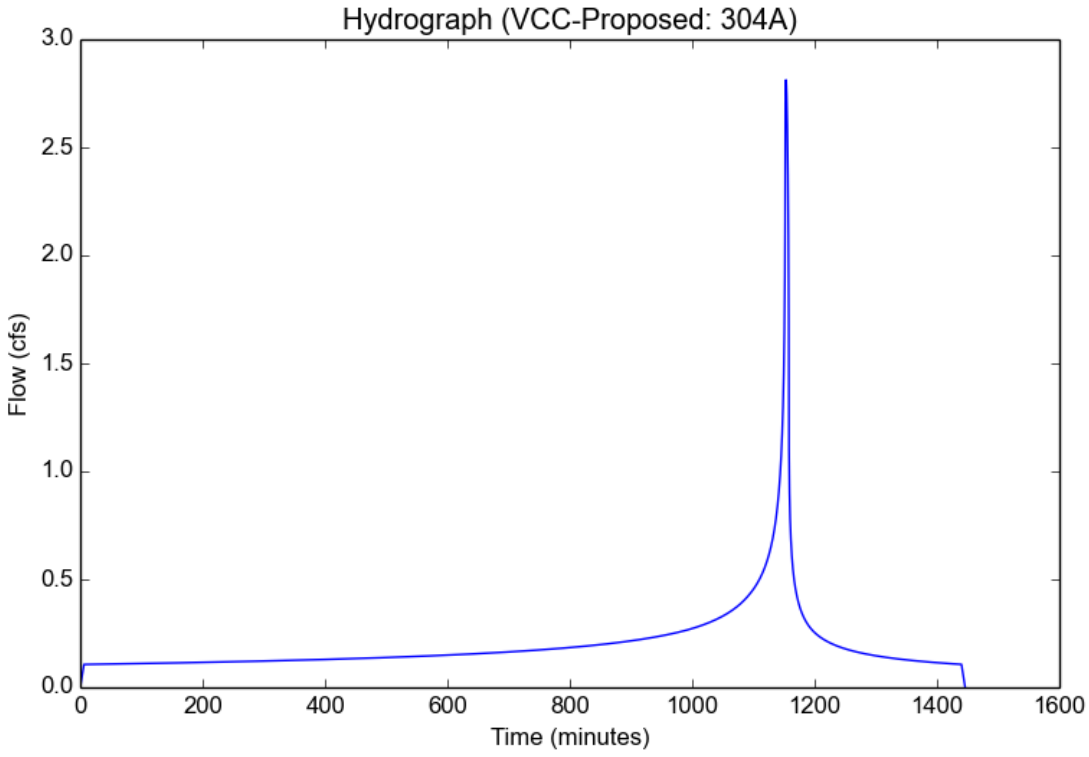
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	304A
Area (ac)	1.0
Flow Path Length (ft)	432.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.1763
Undeveloped Runoff Coefficient (Cu)	0.7381
Developed Runoff Coefficient (Cd)	0.8854
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	2.8124
Burned Peak Flow Rate (cfs)	2.8124
24-Hr Clear Runoff Volume (ac-ft)	0.4013
24-Hr Clear Runoff Volume (cu-ft)	17482.6628



Peak Flow Hydrologic Analysis

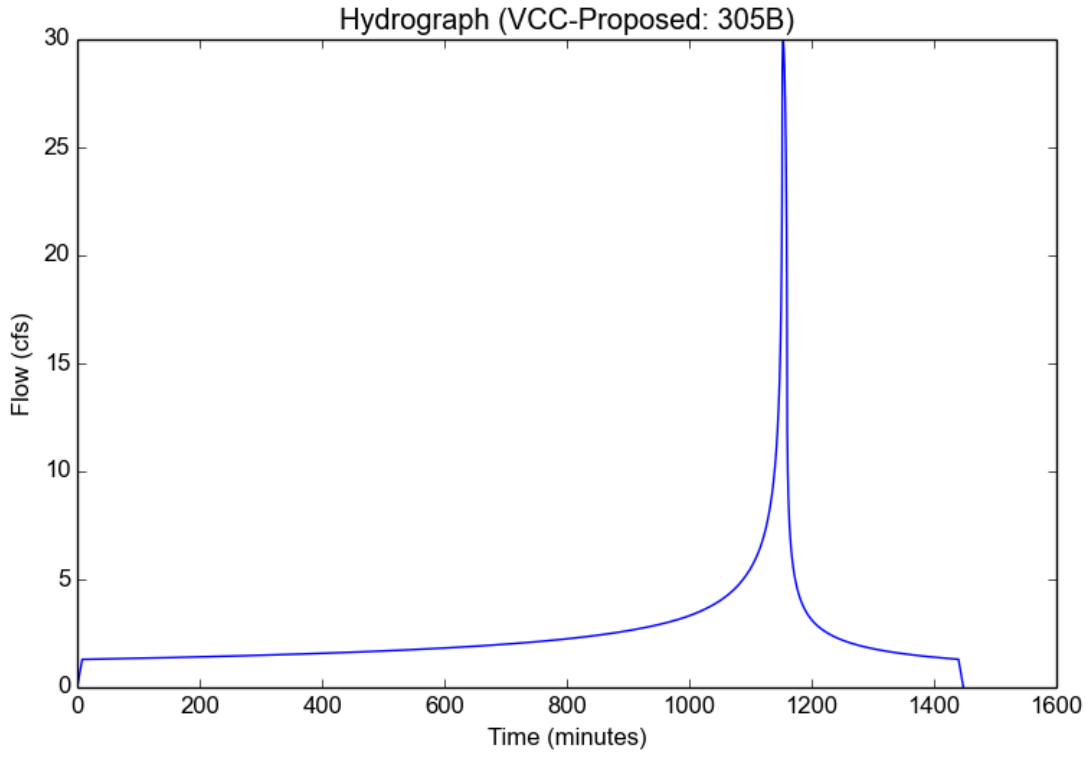
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	305B
Area (ac)	12.2
Flow Path Length (ft)	726.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.7746
Undeveloped Runoff Coefficient (Cu)	0.7191
Developed Runoff Coefficient (Cd)	0.8837
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	29.9135
Burned Peak Flow Rate (cfs)	29.9135
24-Hr Clear Runoff Volume (ac-ft)	4.8963
24-Hr Clear Runoff Volume (cu-ft)	213283.8966



Peak Flow Hydrologic Analysis

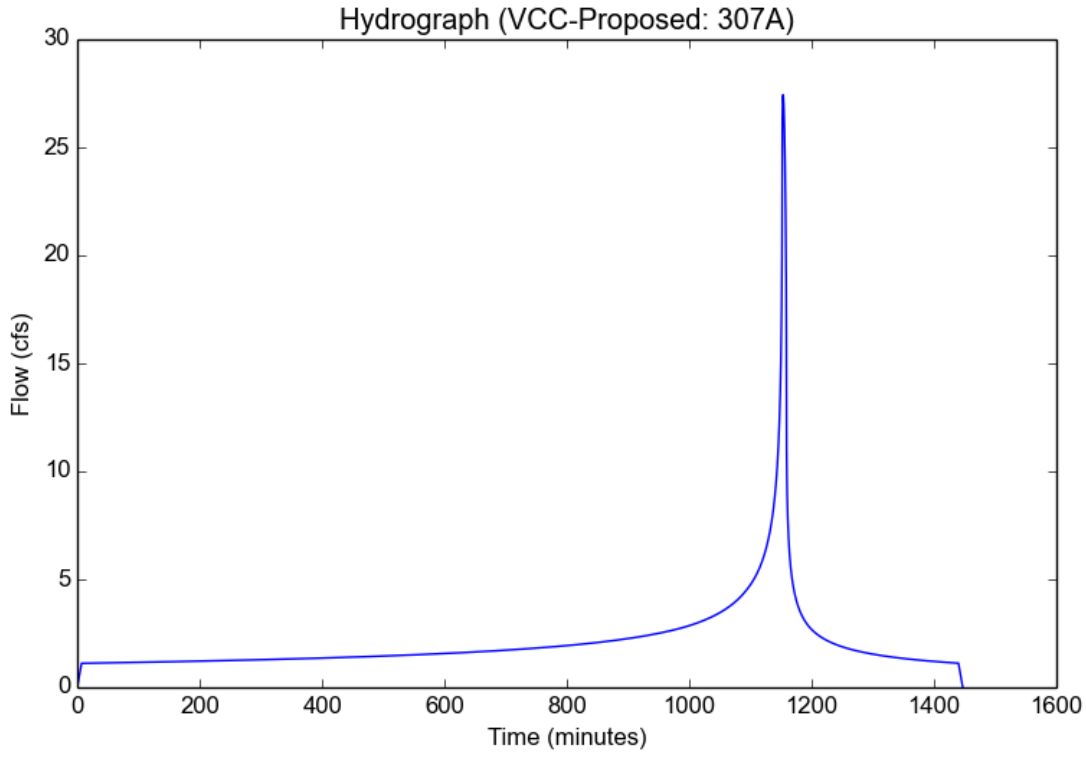
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	307A
Area (ac)	10.5
Flow Path Length (ft)	661.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.9543
Undeveloped Runoff Coefficient (Cu)	0.7276
Developed Runoff Coefficient (Cd)	0.8845
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	27.4366
Burned Peak Flow Rate (cfs)	27.4366
24-Hr Clear Runoff Volume (ac-ft)	4.2141
24-Hr Clear Runoff Volume (cu-ft)	183565.661



Peak Flow Hydrologic Analysis

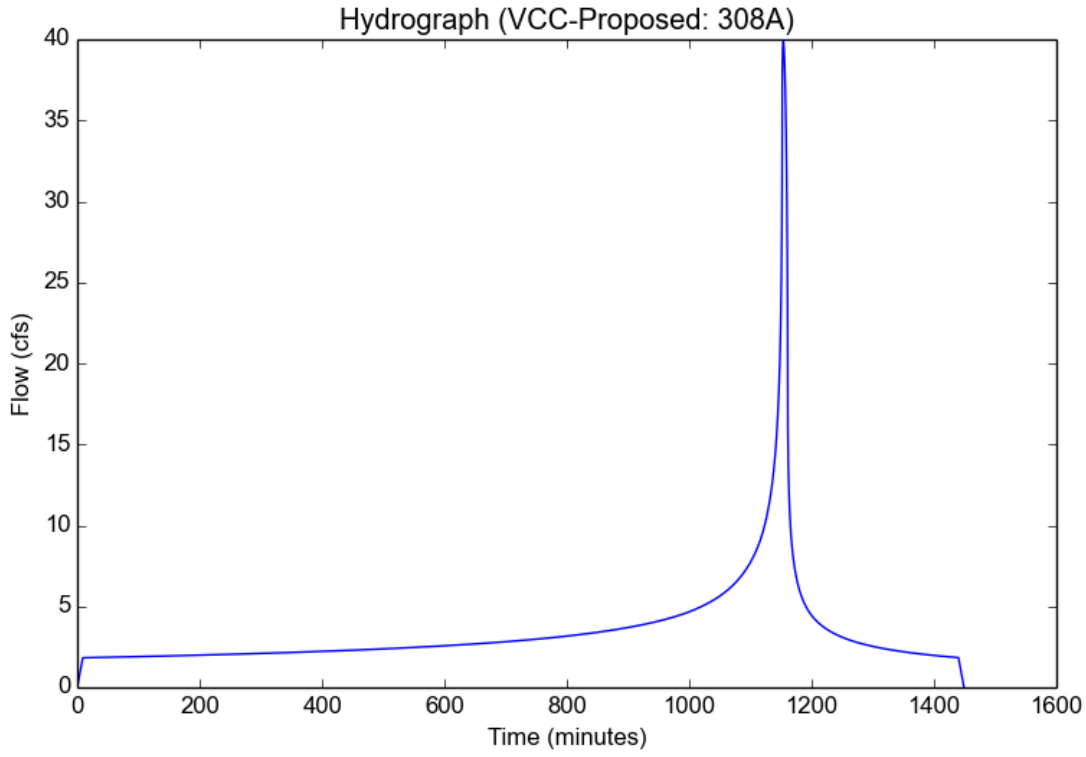
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	308A
Area (ac)	17.2
Flow Path Length (ft)	813.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.6251
Undeveloped Runoff Coefficient (Cu)	0.712
Developed Runoff Coefficient (Cd)	0.8831
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	39.8731
Burned Peak Flow Rate (cfs)	39.8731
24-Hr Clear Runoff Volume (ac-ft)	6.903
24-Hr Clear Runoff Volume (cu-ft)	300692.9023



Peak Flow Hydrologic Analysis

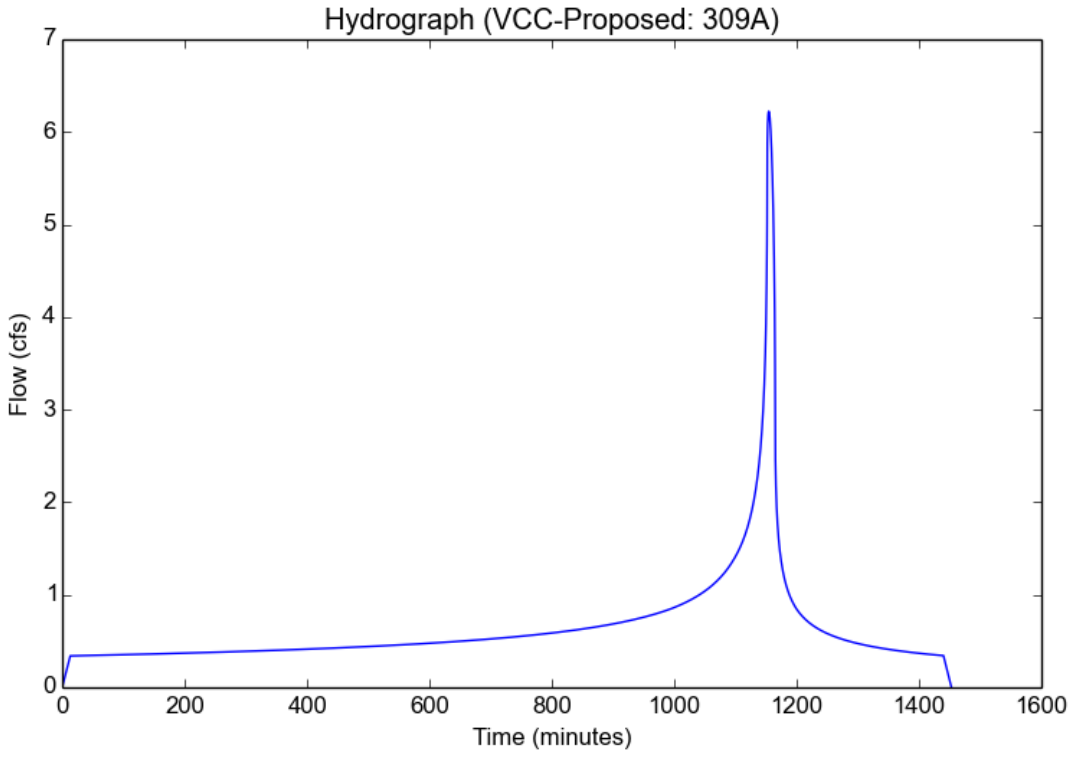
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	309A
Area (ac)	3.2
Flow Path Length (ft)	1301.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.2085
Undeveloped Runoff Coefficient (Cu)	0.6842
Developed Runoff Coefficient (Cd)	0.8806
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	6.2232
Burned Peak Flow Rate (cfs)	6.2232
24-Hr Clear Runoff Volume (ac-ft)	1.2842
24-Hr Clear Runoff Volume (cu-ft)	55939.9826



Peak Flow Hydrologic Analysis

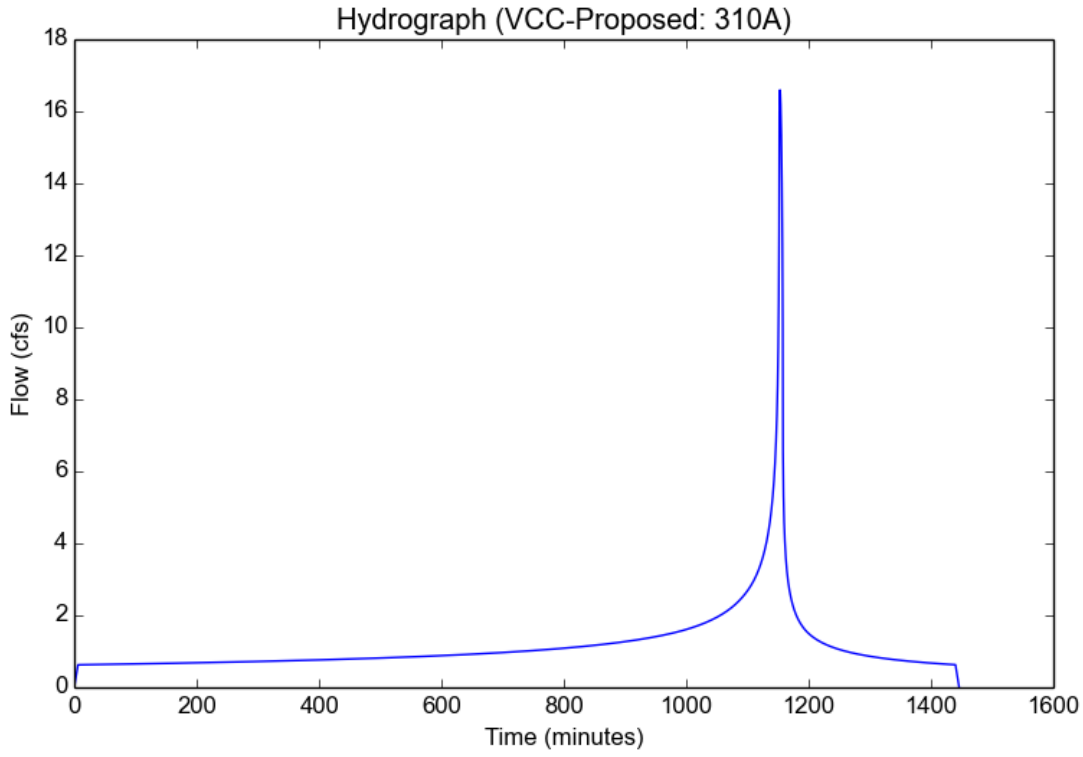
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	310A
Area (ac)	5.9
Flow Path Length (ft)	569.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.1763
Undeveloped Runoff Coefficient (Cu)	0.7381
Developed Runoff Coefficient (Cd)	0.8854
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	16.5929
Burned Peak Flow Rate (cfs)	16.5929
24-Hr Clear Runoff Volume (ac-ft)	2.3679
24-Hr Clear Runoff Volume (cu-ft)	103147.7107



Peak Flow Hydrologic Analysis

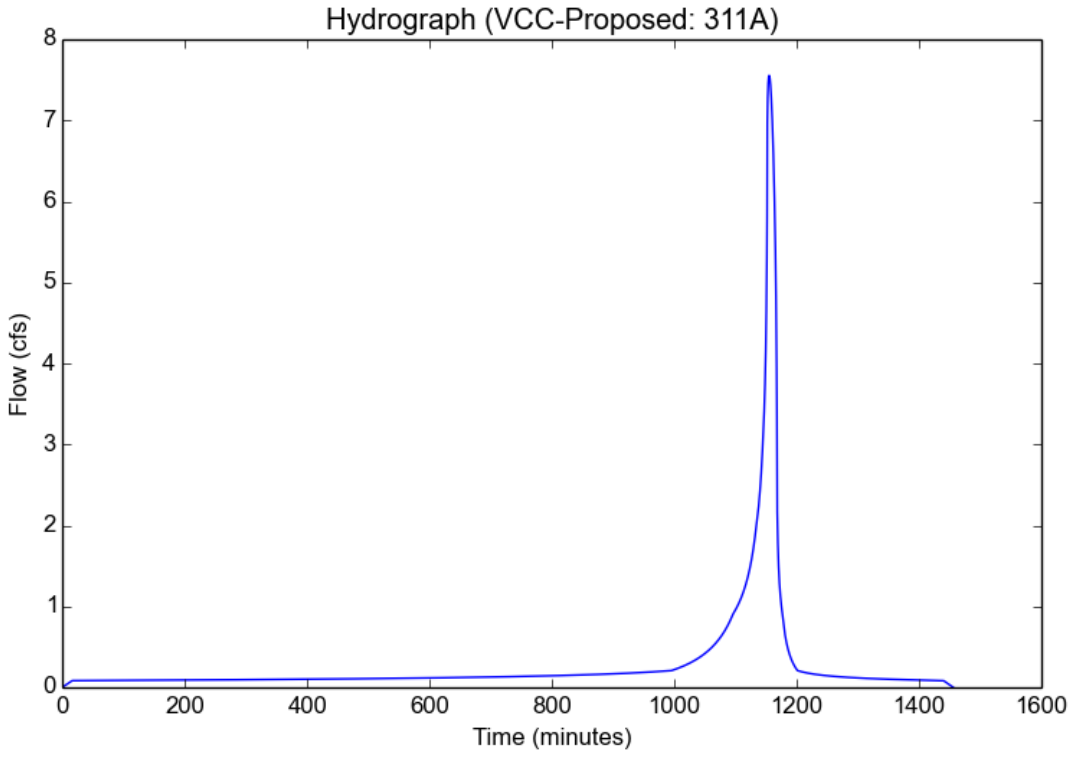
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	311A
Area (ac)	5.6
Flow Path Length (ft)	1957.0
Flow Path Slope (vft/hft)	0.04
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.0031
Undeveloped Runoff Coefficient (Cu)	0.6688
Developed Runoff Coefficient (Cd)	0.6734
Time of Concentration (min)	16.0
Clear Peak Flow Rate (cfs)	7.554
Burned Peak Flow Rate (cfs)	7.554
24-Hr Clear Runoff Volume (ac-ft)	0.5801
24-Hr Clear Runoff Volume (cu-ft)	25267.3241



Peak Flow Hydrologic Analysis

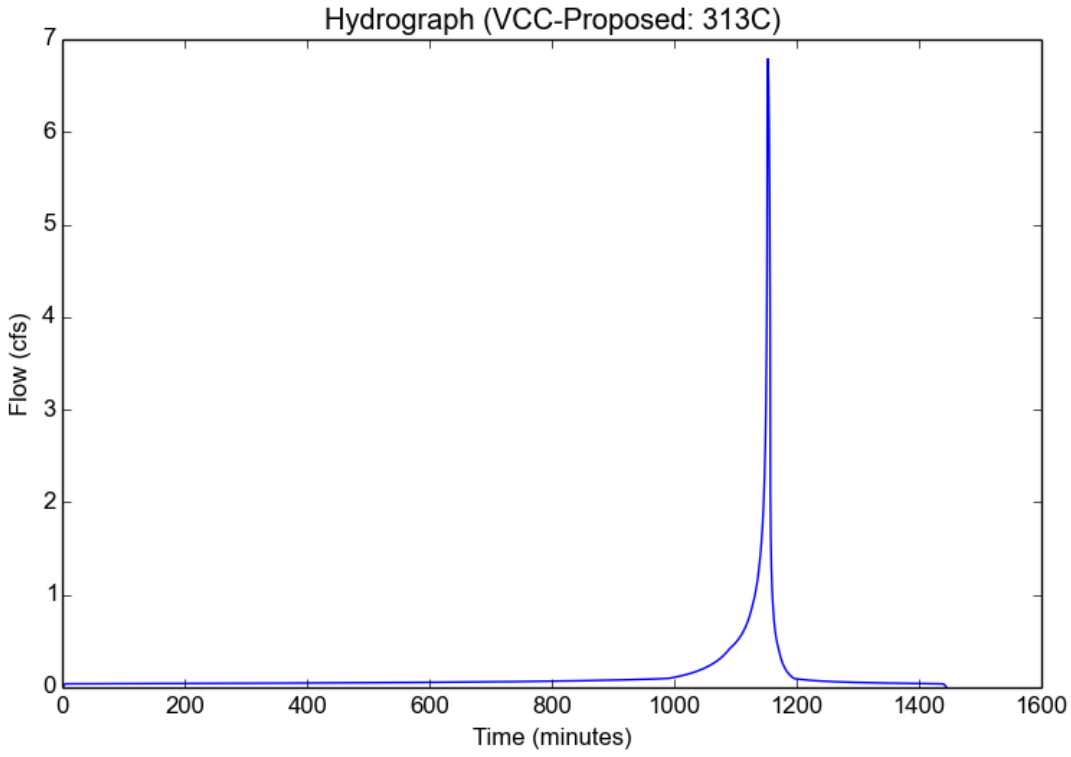
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	313C
Area (ac)	2.6
Flow Path Length (ft)	582.0
Flow Path Slope (vft/hft)	0.23
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.7516
Developed Runoff Coefficient (Cd)	0.7546
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	6.7891
Burned Peak Flow Rate (cfs)	6.7891
24-Hr Clear Runoff Volume (ac-ft)	0.2709
24-Hr Clear Runoff Volume (cu-ft)	11798.75



Peak Flow Hydrologic Analysis

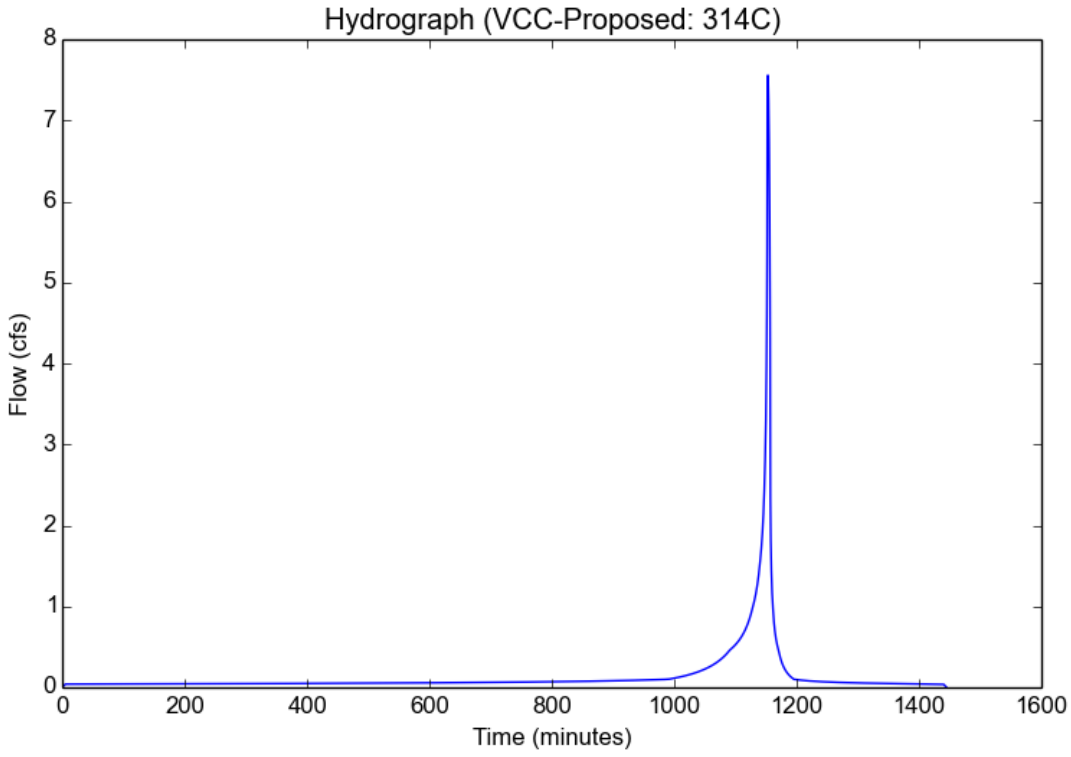
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	314C
Area (ac)	2.9
Flow Path Length (ft)	440.0
Flow Path Slope (vft/hft)	0.26
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.7516
Developed Runoff Coefficient (Cd)	0.7531
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.5576
Burned Peak Flow Rate (cfs)	7.8975
24-Hr Clear Runoff Volume (ac-ft)	0.2924
24-Hr Clear Runoff Volume (cu-ft)	12738.3414



Peak Flow Hydrologic Analysis

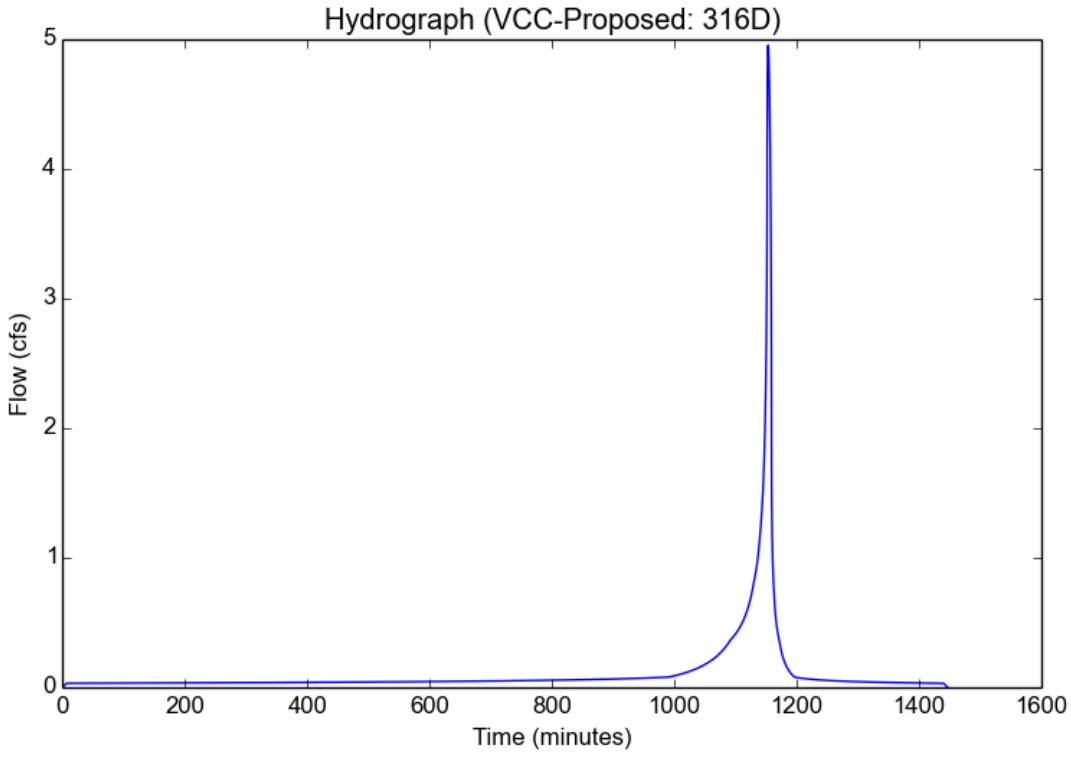
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	316D
Area (ac)	2.3
Flow Path Length (ft)	693.0
Flow Path Slope (vft/hft)	0.06
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.01
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.9543
Undeveloped Runoff Coefficient (Cu)	0.7276
Developed Runoff Coefficient (Cd)	0.7293
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	4.9555
Burned Peak Flow Rate (cfs)	5.2018
24-Hr Clear Runoff Volume (ac-ft)	0.2316
24-Hr Clear Runoff Volume (cu-ft)	10089.5648



Peak Flow Hydrologic Analysis

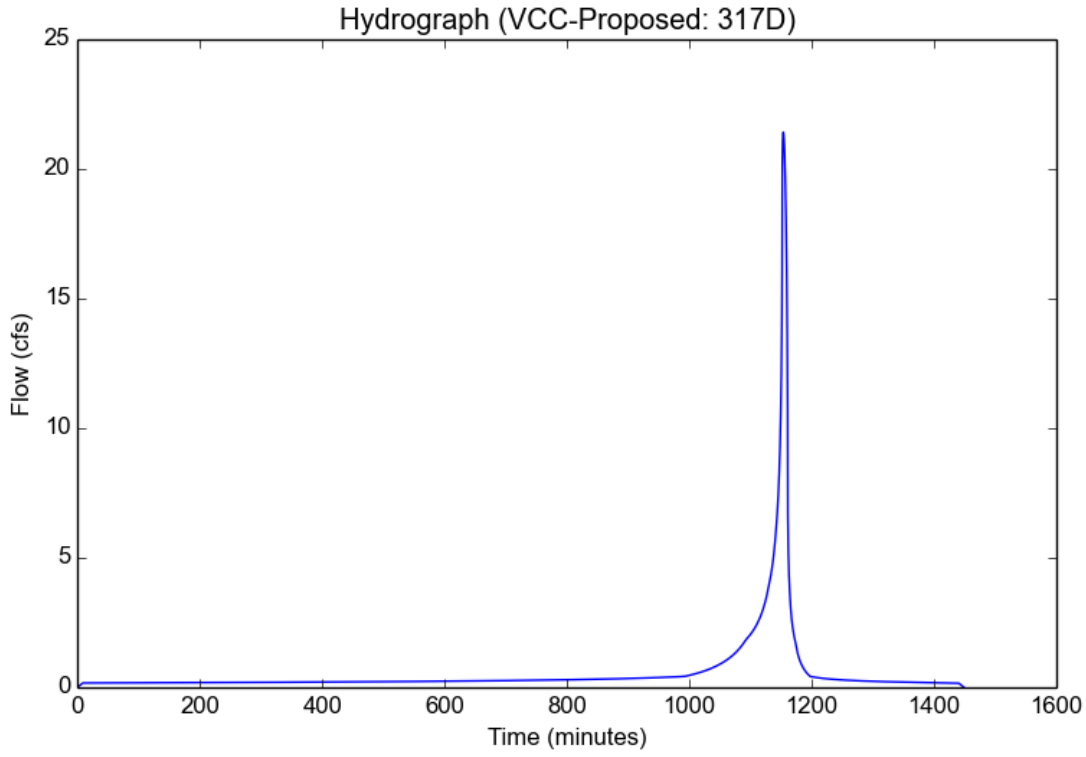
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	317D
Area (ac)	11.4
Flow Path Length (ft)	1206.0
Flow Path Slope (vft/hft)	0.17
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0.34
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.6251
Undeveloped Runoff Coefficient (Cu)	0.712
Developed Runoff Coefficient (Cd)	0.7157
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	21.419
Burned Peak Flow Rate (cfs)	22.5369
24-Hr Clear Runoff Volume (ac-ft)	1.1853
24-Hr Clear Runoff Volume (cu-ft)	51630.034



Peak Flow Hydrologic Analysis

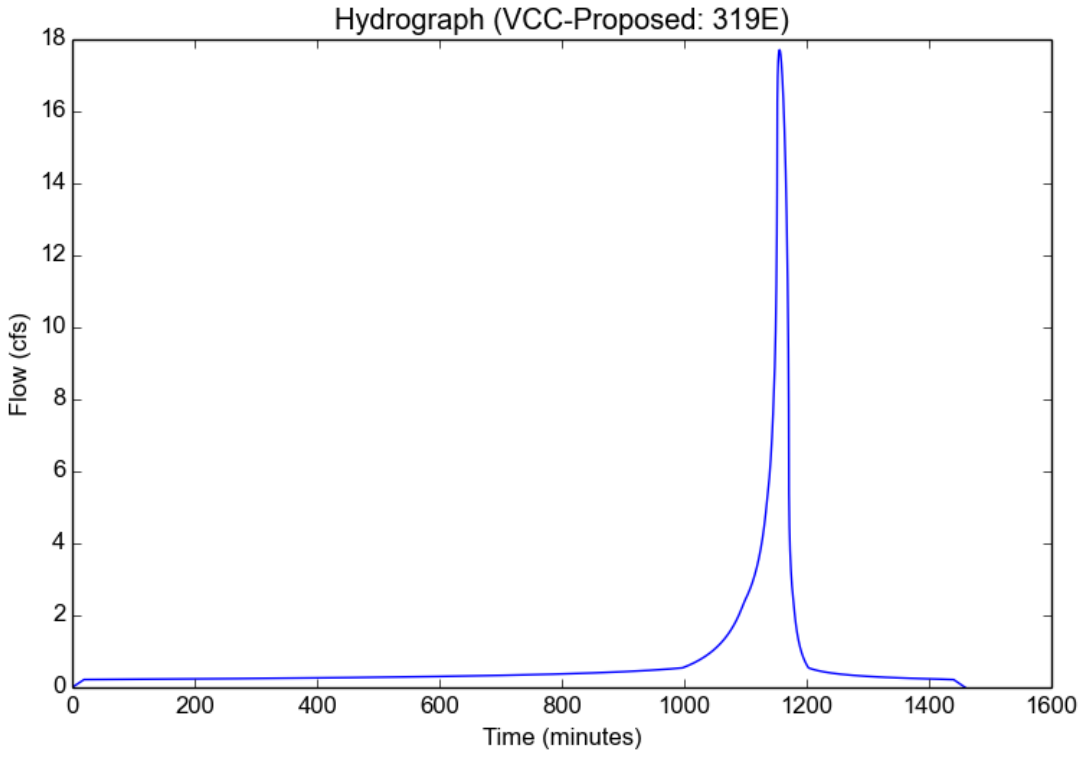
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	319E
Area (ac)	14.6
Flow Path Length (ft)	2050.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	97
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	1.8477
Undeveloped Runoff Coefficient (Cu)	0.6516
Developed Runoff Coefficient (Cd)	0.6565
Time of Concentration (min)	19.0
Clear Peak Flow Rate (cfs)	17.7112
Burned Peak Flow Rate (cfs)	17.7112
24-Hr Clear Runoff Volume (ac-ft)	1.5093
24-Hr Clear Runoff Volume (cu-ft)	65744.0791



Peak Flow Hydrologic Analysis

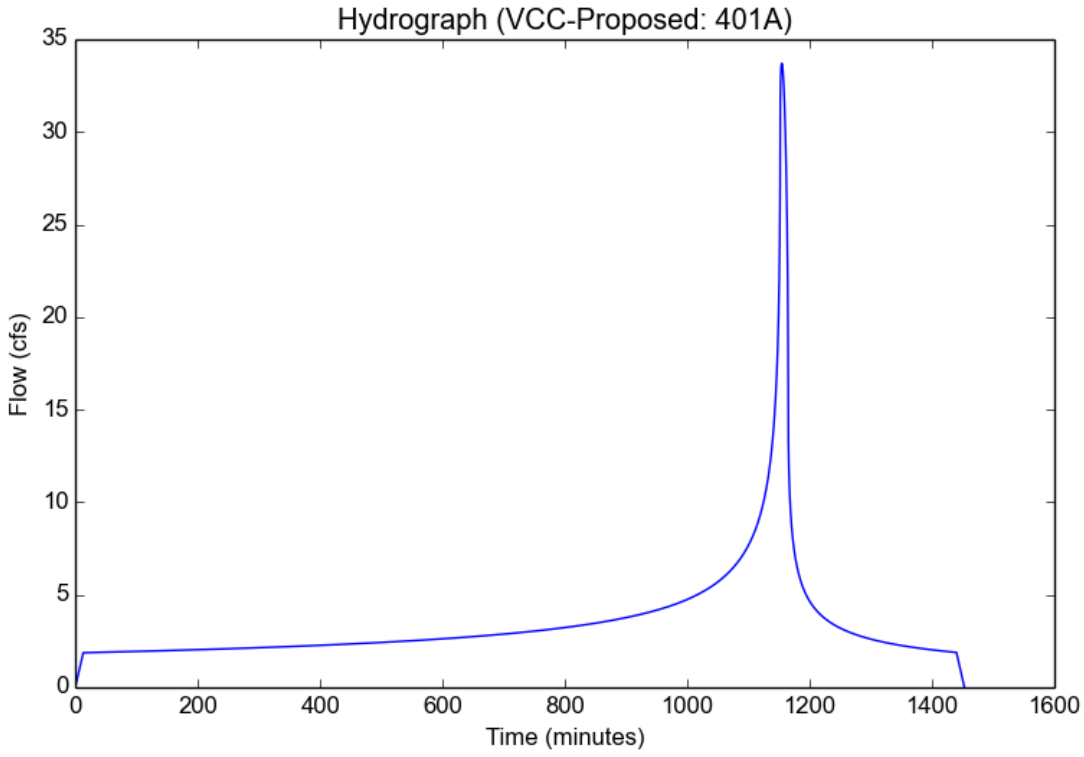
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	401A
Area (ac)	17.6
Flow Path Length (ft)	1780.0
Flow Path Slope (vft/hft)	0.03
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.2085
Undeveloped Runoff Coefficient (Cu)	0.535
Developed Runoff Coefficient (Cd)	0.8671
Time of Concentration (min)	13.0
Clear Peak Flow Rate (cfs)	33.7053
Burned Peak Flow Rate (cfs)	33.7053
24-Hr Clear Runoff Volume (ac-ft)	7.0332
24-Hr Clear Runoff Volume (cu-ft)	306366.0143



Peak Flow Hydrologic Analysis

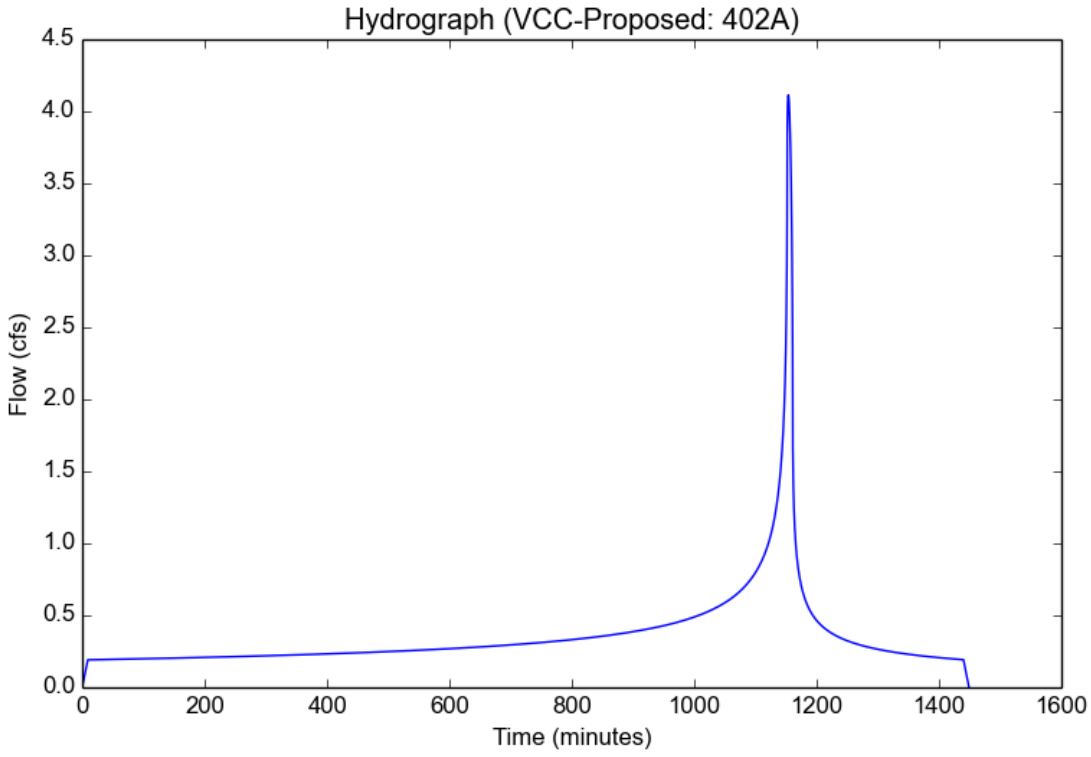
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	402A
Area (ac)	1.8
Flow Path Length (ft)	730.0
Flow Path Slope (vft/hft)	0.01
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.6251
Undeveloped Runoff Coefficient (Cu)	0.5727
Developed Runoff Coefficient (Cd)	0.8705
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	4.1135
Burned Peak Flow Rate (cfs)	4.1135
24-Hr Clear Runoff Volume (ac-ft)	0.7194
24-Hr Clear Runoff Volume (cu-ft)	31335.8716



Peak Flow Hydrologic Analysis

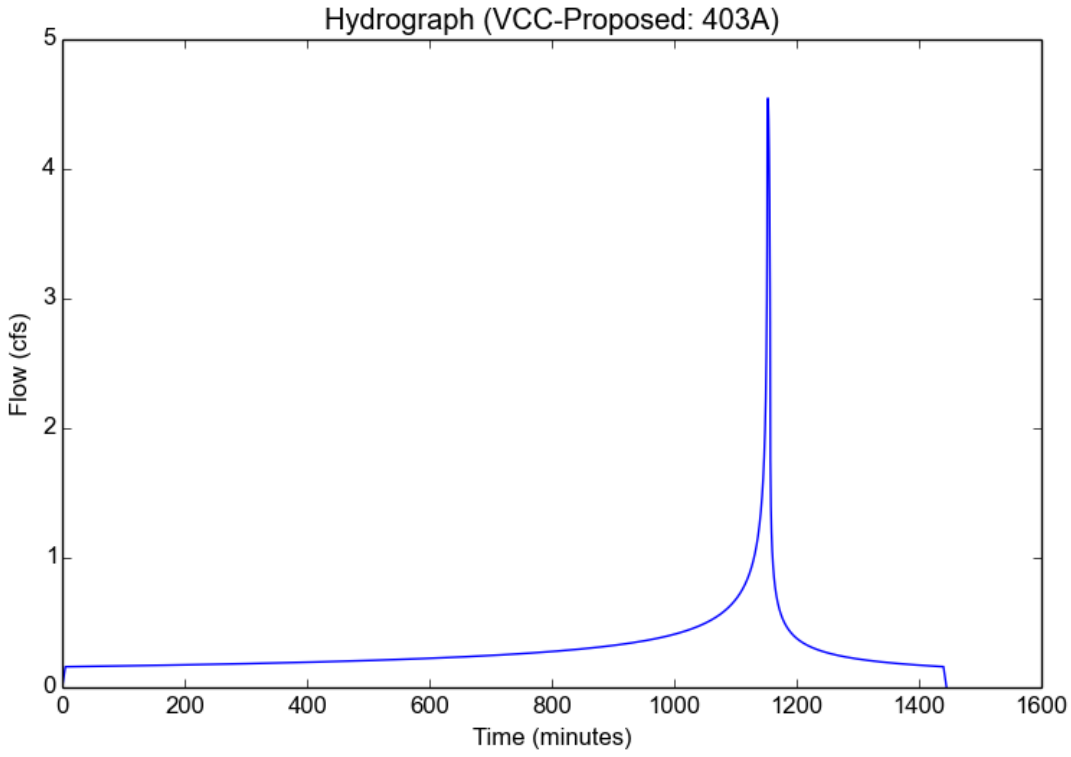
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	403A
Area (ac)	1.5
Flow Path Length (ft)	246.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.6321
Developed Runoff Coefficient (Cd)	0.8759
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	4.5464
Burned Peak Flow Rate (cfs)	4.5464
24-Hr Clear Runoff Volume (ac-ft)	0.5996
24-Hr Clear Runoff Volume (cu-ft)	26116.6001



Peak Flow Hydrologic Analysis

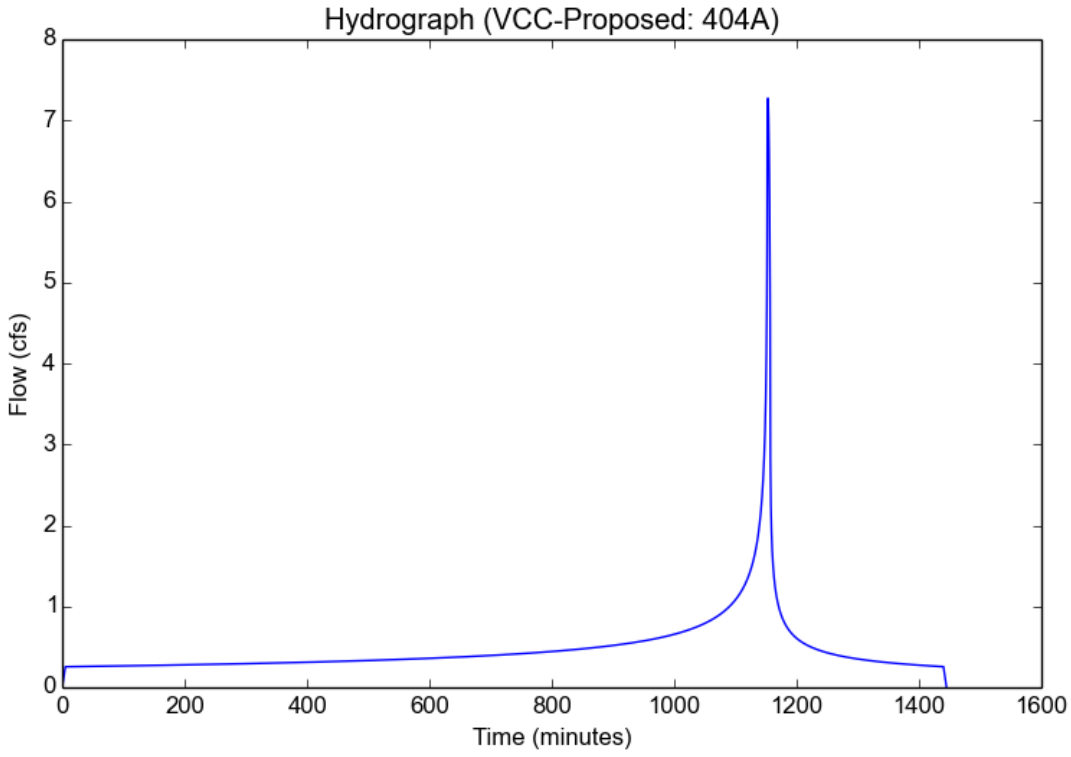
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	404A
Area (ac)	2.4
Flow Path Length (ft)	372.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.6321
Developed Runoff Coefficient (Cd)	0.8759
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	7.2743
Burned Peak Flow Rate (cfs)	7.2743
24-Hr Clear Runoff Volume (ac-ft)	0.9593
24-Hr Clear Runoff Volume (cu-ft)	41786.5601



Peak Flow Hydrologic Analysis

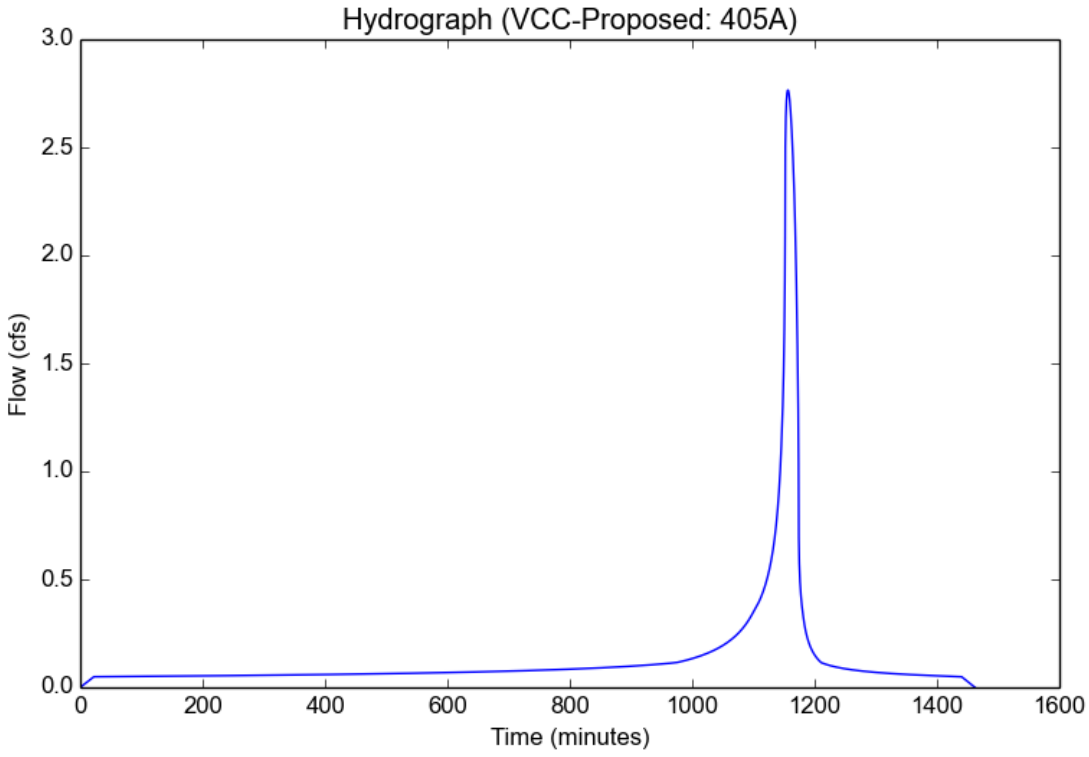
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	405A
Area (ac)	3.3
Flow Path Length (ft)	1874.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	1.7247
Undeveloped Runoff Coefficient (Cu)	0.4774
Developed Runoff Coefficient (Cd)	0.4859
Time of Concentration (min)	22.0
Clear Peak Flow Rate (cfs)	2.7652
Burned Peak Flow Rate (cfs)	2.7652
24-Hr Clear Runoff Volume (ac-ft)	0.278
24-Hr Clear Runoff Volume (cu-ft)	12110.265



Peak Flow Hydrologic Analysis

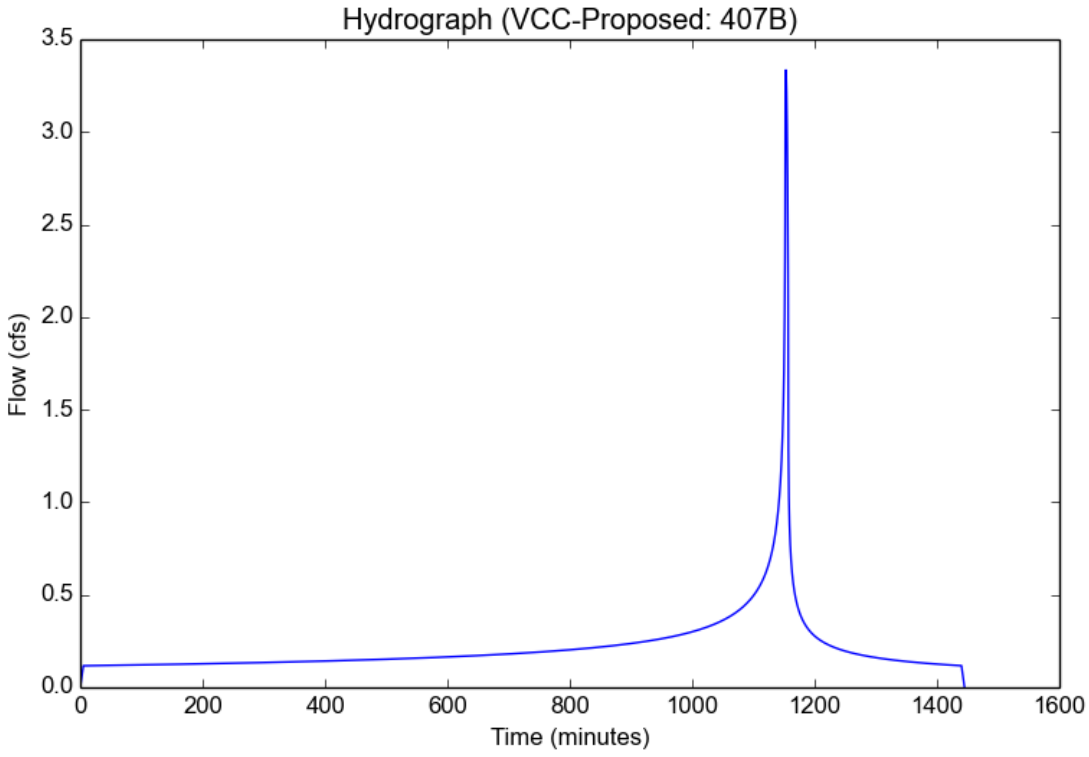
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	407B
Area (ac)	1.1
Flow Path Length (ft)	206.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.4604
Undeveloped Runoff Coefficient (Cu)	0.6321
Developed Runoff Coefficient (Cd)	0.8759
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	3.334
Burned Peak Flow Rate (cfs)	3.334
24-Hr Clear Runoff Volume (ac-ft)	0.4397
24-Hr Clear Runoff Volume (cu-ft)	19152.1734



Peak Flow Hydrologic Analysis

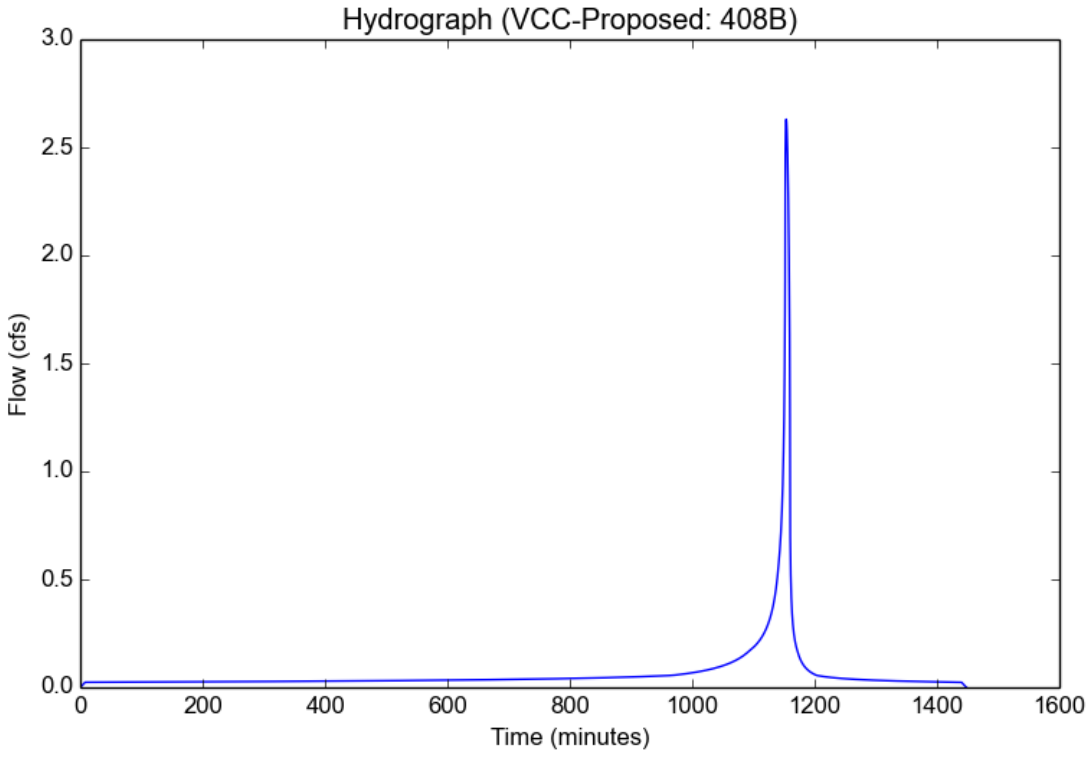
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	408B
Area (ac)	1.6
Flow Path Length (ft)	629.0
Flow Path Slope (vft/hft)	0.04
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	2.7746
Undeveloped Runoff Coefficient (Cu)	0.5862
Developed Runoff Coefficient (Cd)	0.5924
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	2.6301
Burned Peak Flow Rate (cfs)	2.6301
24-Hr Clear Runoff Volume (ac-ft)	0.1372
24-Hr Clear Runoff Volume (cu-ft)	5978.4931



Peak Flow Hydrologic Analysis

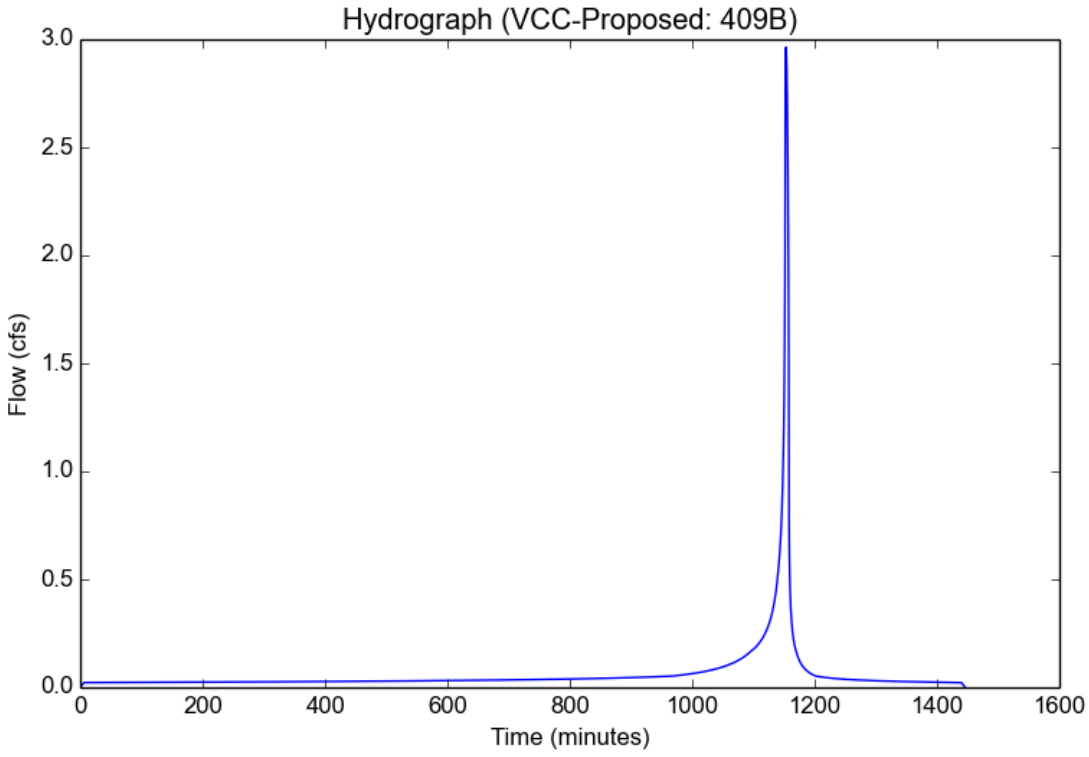
File location: G:/Newhall Ranch/18108 VCC/Storm/Hydrology/Calculations/HydroCalc/Proposed/VCC-Proposed Report.pdf
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC-Proposed
Subarea ID	409B
Area (ac)	1.5
Flow Path Length (ft)	342.0
Flow Path Slope (vft/hft)	0.02
50-yr Rainfall Depth (in)	5.8
Percent Impervious	0.02
Soil Type	20
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.8
Peak Intensity (in/hr)	3.1763
Undeveloped Runoff Coefficient (Cu)	0.6163
Developed Runoff Coefficient (Cd)	0.622
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	2.9635
Burned Peak Flow Rate (cfs)	2.9635
24-Hr Clear Runoff Volume (ac-ft)	0.1291
24-Hr Clear Runoff Volume (cu-ft)	5625.145



3. Existing Debris Production Calculation

EXISTING SUBAREA 101A

REFER TO EQUATION 3.3.1 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Equation 3.3.1

$$DP = DPR_{(A)} \times A$$

Where: DP = Debris Production in yd^3

DPR = Debris Production Rate in yd^3/mi^2

AREA	0.0189	SQ MI	
$DPR_{(A)}$	16500	CU YD/SQ MI	DP FOR DPA 9 (Total Area)
DP=	311.85	CU YD	

EXISTING WATERSHED 200

EXISTING SUBAREA 201A

REFER TO EQUATION 3.3.1 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

$$DP = DPR_{(A)} \times A$$ **Equation 3.3.1**

Where: DP = Debris Production in yd^3

DPR = Debris Production Rate in yd^3/mi^2

AREA		0.0633	SQ MI	
$DPR_{(A)}$		16500	CU YD/SQ MI	DP FOR DPA 9 (Total Area)
	DP=	1044.45	CU YD	

EXISTING SUBAREA 202A

AREA		0.0195	SQ MI	
$DPR_{(A)}$		16500	CU YD/SQ MI	DP FOR DPA 9 (Total Area)
	DP=	321.75	CU YD	

EXISTING SUBAREA 203B

AREA		0.0011	SQ MI	
$DPR_{(A)}$		16500	CU YD/SQ MI	DP FOR DPA 9 (Total Area)
	DP=	18.15	CU YD	

EXISTING SUBAREA 204C

AREA		0.0033	SQ MI	
$DPR_{(A)}$		16500	CU YD/SQ MI	DP FOR DPA 9 (Total Area)
	DP=	54.45	CU YD	

EXISTING WATERSHED 300

EXISTING SUBAREA 301A

REFER TO EQUATION 3.3.1 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Equation 3.3.1

$$DP = DPR_{(A)} \times A$$

Where: DP = Debris Production in yd^3

DPR = Debris Production Rate in yd^3/mi^2

AREA	0.0042	SQ MI	
$DPR_{(A)}$	16500	CU YD/SQ MI	DP FOR DPA 9 (Total Area)
DP=	69.30	CU YD	

EXISTING SUBAREA 302A

REFER TO EQUATION 3.3.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Equation 3.3.4

$$DP = DPR_{1(A_1+A_2)} \times A_1\left(\frac{A_1}{A_1+A_2}\right) + DPR_{1(A_1)} \times A_1\left(\frac{A_2}{A_1+A_2}\right) + DPR_{2(A_1+A_2)} \times A_2\left(\frac{A_2}{A_1+A_2}\right) + DPR_{2(A_2)} \times A_2\left(\frac{A_1}{A_1+A_2}\right)$$

$DPR_{1(A1+A2)}$	16500	CU YD/SQ MI	DPR FOR DPA 9 (Total Area)
$DPR_{2(A1+A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5 (Total Area)
$DPR_{1(A1)}$	16500	CU YD/SQ MI	DPR FOR DPA 9
$DPR_{2(A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5
A_1	0.0202	SQ MI	Area for DPA 9
A_2	0.0007	SQ MI	Area for DPA 5
DP=	390.70	CU YD	

EXISTING SUBAREA 303A

REFER TO EQUATION 3.3.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

$DPR_{1(A1+A2)}$	16500	CU YD/SQ MI	DPR FOR DPA 9 (Total Area)
$DPR_{2(A1+A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5 (Total Area)
$DPR_{1(A1)}$	16500	CU YD/SQ MI	DPR FOR DPA 9
$DPR_{2(A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5
A_1	0.0116	SQ MI	Area for DPA 9
A_2	0.0065	SQ MI	Area for DPA 5
DP=	724.40	CU YD	

EXISTING SUBAREA 304B

REFER TO EQUATION 3.3.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

$DPR_{1(A1+A2)}$	16500	CU YD/SQ MI	DPR FOR DPA 9 (Total Area)
$DPR_{2(A1+A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5 (Total Area)
$DPR_{1(A1)}$	16500	CU YD/SQ MI	DPR FOR DPA 9
$DPR_{2(A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5
A_1	0.0030	SQ MI	Area for DPA 9
A_2	0.0006	SQ MI	Area for DPA 5
DP=	98.70	CU YD	

EXISTING SUBAREA 305B

REFER TO EQUATION 3.3.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

$DPR_{1(A1+A2)}$	16500	CU YD/SQ MI	DPR FOR DPA 9 (Total Area)
$DPR_{2(A1+A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5 (Total Area)
$DPR_{1(A1)}$	16500	CU YD/SQ MI	DPR FOR DPA 9
$DPR_{2(A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5
A_1	0.0049	SQ MI	Area for DPA 9
A_2	0.0180	SQ MI	Area for DPA 5
DP=	1556.85	CU YD	

EXISTING SUBAREA 306B

REFER TO EQUATION 3.3.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

$DPR_{1(A1+A2)}$	16500	CU YD/SQ MI	DPR FOR DPA 9 (Total Area)
$DPR_{2(A1+A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5 (Total Area)
$DPR_{1(A1)}$	16500	CU YD/SQ MI	DPR FOR DPA 9
$DPR_{2(A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5
A_1	0.0003	SQ MI	Area for DPA 9
A_2	0.0430	SQ MI	Area for DPA 5
DP=	3530.95	CU YD	

EXISTING SUBAREA 307B

REFER TO EQUATION 3.3.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

$DPR_{1(A1+A2)}$	16500	CU YD/SQ MI	DPR FOR DPA 9 (Total Area)
$DPR_{2(A1+A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5 (Total Area)
$DPR_{1(A1)}$	16500	CU YD/SQ MI	DPR FOR DPA 9
$DPR_{2(A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5
A_1	0.0297	SQ MI	Area for DPA 9
A_2	0.0015	SQ MI	Area for DPA 5
DP=	613.05	CU YD	

EXISTING WATERSHED 400

EXISTING SUBAREA 401A

REFER TO EQUATION 3.3.1 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Equation 3.3.1

$$DP = DPR_{(A)} \times A$$

Where: DP = Debris Production in yd^3

DPR = Debris Production Rate in yd^3/mi^2

AREA		0.0277	SQ MI	
$DPR_{(A)}$		16500	CU YD/SQ MI	DP FOR DPA 9 (Total Area)
	DP=	457.05	CU YD	

EXISTING SUBAREA 402A

AREA		0.0103	SQ MI	
$DPR_{(A)}$		16500	CU YD/SQ MI	DP FOR DPA 9 (Total Area)
	DP=	169.95	CU YD	

EXISTING SUBAREA 403A

AREA		0.0089	SQ MI	
$DPR_{(A)}$		16500	CU YD/SQ MI	DP FOR DPA 9 (Total Area)
	DP=	146.85	CU YD	

4. Proposed Debris Production Calculation

PROPOSED SUBAREA 314C

Using eq 3.3.1 of sedimentation manual (March 2006)

$$DP = DPR_{(A)} \times A$$ **Equation 3.3.1**

DPR_A	16500	CU YD/SQ MI	DPR FOR DPA 9
A	0.0045	SQ MI	Area for DPA 9
DP=	74.25	CU YD	

PROPOSED SUBAREA 317D

Using eq 3.3.4 of sedimentation manual (March 2006)

$$DP = DPR_{1(A_1+A_2)} \times A_1\left(\frac{A_1}{A_1+A_2}\right) + DPR_{1(A_1)} \times A_1\left(\frac{A_2}{A_1+A_2}\right) + DPR_{2(A_1+A_2)} \times A_2\left(\frac{A_2}{A_1+A_2}\right) + DPR_{2(A_2)} \times A_2\left(\frac{A_1}{A_1+A_2}\right)$$ **Equation 3.3.4**

$DPR_{1(A1+A2)}$	16500	CU YD/SQ MI	DPR FOR DPA 9 (Total Area)
$DPR_{2(A1+A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5 (Total Area)
$DPR_{1(A1)}$	16500	CU YD/SQ MI	DPR FOR DPA 9
$DPR_{2(A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5
A_1	0.0030	SQ MI	Area for DPA 9
A_2	0.0006	SQ MI	Area for DPA 5
DP=	98.70	CU YD	

PROPOSED SUBAREA 318D

Using eq 3.3.5 of sedimentation manual (March 2006)

$$DP = DPR_{1(A_1+A_2)}\,(A_1 - A_{d_1})\left(\frac{A_1 - A_{d_1}}{A_1+A_2}\right) + DPR_{1(A_1-A_{d_1})}\,(A_1 - A_{d_1})\left(\frac{A_2 + A_{d_1}}{A_1+A_2}\right) + DPR_{2(A_1+A_2)}\,(A_2 - A_{d_2})\left(\frac{A_2 - A_{d_2}}{A_1+A_2}\right) + DPR_{2(A_2-A_{d_2})}\,(A_2 - A_{d_2})\left(\frac{A_1 + A_{d_2}}{A_1+A_2}\right)$$ **Equation 3.3.5**

$DPR_{1(A1+A2)}$	16500	CU YD/SQ MI	DPR FOR DPA 9 (Total Area)
$DPR_{2(A1+A2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5 (Total Area)
$DPR_{1(A1-Ad1)}$	16500	CU YD/SQ MI	DPR FOR DPA 9 (Total Undeveloped Area)
$DPR_{2(A2-Ad2)}$	82000	CU YD/SQ MI	DPR FOR DPA 5 (Total Undeveloped Area)
A_1	0.0036	SQ MI	Area for DPA 9
A_2	0.0142	SQ MI	Area for DPA 5
A_{d1}	0.0012	SQ MI	Developed Area for DPA 9
A_{d2}	0.0038	SQ MI	Developed Area for DPA 5
DP=	892.40	CU YD	

5. Existing Bulk Flow Calculation

EXISTING SUBAREA 101A

REFER TO EQUATION 3.4.1 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For single undeveloped watersheds (see Figure 3.3.1):

$$Q_B = BF_{(A)} \times Q_{(A)}$$ **Equation 3.4.1**

$Q_{(A)}$= Burned Discharge		16.01	CFS	
$BF_{(A)}$		1.270	unitless	BF FOR DPA 9 (Total Area)
	Q=	20.33	CFS	

EXISTING WATERSHED 200

REFER TO EQUATION 3.4.1 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For single undeveloped watersheds (see Figure 3.3.1):

$$Q_B = BF_{(A)} \times Q_{(A)}$$ **Equation 3.4.1**

EXISTING SUBAREA 201A

$Q_{(A)}$= Burned Discharge 33.36 CFS

$BF_{(A)}$ 1.270 unitless BF FOR DPA 9 (Total Area)

Q= 42.37 CFS

EXISTING SUBAREA 202A

$Q_{(A)}$= Burned Discharge 23.95 CFS

$BF_{(A)}$ 1.270 unitless BF FOR DPA 9 (Total Area)

Q= 30.42 CFS

EXISTING SUBAREA 203B

$Q_{(A)}$= Burned Discharge 1.03 CFS

$BF_{(A)}$ 1.270 unitless BF FOR DPA 9 (Total Area)

Q= 1.31 CFS

EXISTING SUBAREA 204C

$Q_{(A)}$= Burned Discharge 2.26 CFS

$BF_{(A)}$ 1.270 unitless BF FOR DPA 9 (Total Area)

Q= 2.87 CFS

EXISTING WATERSHED 300

EXISTING SUBAREA 301A

REFER TO EQUATION 3.4.1 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For single undeveloped watersheds (see Figure 3.3.1):

$$Q_B = BF_{(A)} \times Q_{(A)}$$ **Equation 3.4.1**

$Q_{(A)}$= Burned Discharge	7.37	CFS	
$BF_{(A)}$	1.270	unitless	BF FOR DPA 9 (Total Area)
Q=	9.36	CFS	

EXISTING SUBAREA 302A

REFER TO EQUATION 3.4.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

$$Q_B = BF_{1(A_1+A_2)} \times \left(\frac{Q\ A_1}{A_1+A_2}\right)\left(\frac{A_1}{A_1+A_2}\right) + BF_{1(A_1)} \times \left(\frac{Q\ A_1}{A_1+A_2}\right)\left(\frac{A_2}{A_1+A_2}\right) +$$
$$BF_{2(A_1+A_2)} \times \left(\frac{Q\ A_2}{A_1+A_2}\right)\left(\frac{A_2}{A_1+A_2}\right) + BF_{2(A_2)} \times \left(\frac{Q\ A_2}{A_1+A_2}\right)\left(\frac{A_1}{A_1+A_2}\right)$$ **Equation 3.4.4**

$$Q = Q_{A_1+A_2}$$

Q=Burned Discharge	32.65	CFS	
$BF_{1(A1)}$	1.270	unitless	BF FOR DPA 9
$BF_{2(A2)}$	1.456	unitless	BF FOR DPA 5
$BF_{1(A1+A2)}$	1.270	unitless	BF FOR DPA 9 (Total Area)
$BF_{2(A1+A2)}$	1.456	unitless	BF FOR DPA 5 (Total Area)
A_1	0.0202	SQ MI	Area for DPA 9
A_2	0.0007	SQ MI	Area for DPA 5
Q=	41.67	CFS	

EXISTING SUBAREA 303A

REFER TO EQUATION 3.4.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Q=Burned Discharge	21.58	CFS	
$BF_{1(A1)}$	1.270	unitless	BF FOR DPA 9
$BF_{2(A2)}$	1.456	unitless	BF FOR DPA 5
$BF_{1(A1+A2)}$	1.270	unitless	BF FOR DPA 9 (Total Area)
$BF_{2(A1+A2)}$	1.456	unitless	BF FOR DPA 5 (Total Area)
A_1	0.0116	SQ MI	Area for DPA 9
A_2	0.0065	SQ MI	Area for DPA 5
Q=	28.85	CFS	

EXISTING SUBAREA 304B

REFER TO EQUATION 3.4.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Q=Burned Discharge	5.14	CFS	
$BF_{1(A1)}$	1.270	unitless	BF FOR DPA 9
$BF_{2(A2)}$	1.456	unitless	BF FOR DPA 5
$BF_{1(A1+A2)}$	1.270	unitless	BF FOR DPA 9 (Total Area)
$BF_{2(A1+A2)}$	1.456	unitless	BF FOR DPA 5 (Total Area)
A_1	0.0030	SQ MI	Area for DPA 9
A_2	0.0006	SQ MI	Area for DPA 5
Q=	6.69	CFS	

EXISTING SUBAREA 305B

REFER TO EQUATION 3.4.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Q=Burned Discharge	27.91	CFS	
$BF_{1(A1)}$	1.270	unitless	BF FOR DPA 9
$BF_{2(A2)}$	1.456	unitless	BF FOR DPA 5
$BF_{1(A1+A2)}$	1.270	unitless	BF FOR DPA 9 (Total Area)
$BF_{2(A1+A2)}$	1.456	unitless	BF FOR DPA 5 (Total Area)
A_1	0.0049	SQ MI	Area for DPA 9
A_2	0.0180	SQ MI	Area for DPA 5
Q=	39.53	CFS	

EXISTING SUBAREA 306B

REFER TO EQUATION 3.4.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Q=Burned Discharge	48.67	CFS	
$BF_{1(A1)}$	1.270	unitless	BF FOR DPA 9
$BF_{2(A2)}$	1.456	unitless	BF FOR DPA 5
$BF_{1(A1+A2)}$	1.270	unitless	BF FOR DPA 9 (Total Area)
$BF_{2(A1+A2)}$	1.456	unitless	BF FOR DPA 5 (Total Area)
A_1	0.0003	SQ MI	Area for DPA 9
A_2	0.0430	SQ MI	Area for DPA 5
Q=	70.80	CFS	

EXISTING SUBAREA 307B

REFER TO EQUATION 3.4.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

Q=Burned Discharge	38.33	CFS	
$BF_{1(A1)}$	1.270	unitless	BF FOR DPA 9
$BF_{2(A2)}$	1.456	unitless	BF FOR DPA 5
$BF_{1(A1+A2)}$	1.270	unitless	BF FOR DPA 9 (Total Area)
$BF_{2(A1+A2)}$	1.456	unitless	BF FOR DPA 5 (Total Area)
A_1	0.0297	SQ MI	Area for DPA 9
A_2	0.0015	SQ MI	Area for DPA 5
Q=	49.02	CFS	

EXISTING WATERSHED 400

REFER TO EQUATION 3.4.1 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For single undeveloped watersheds (see Figure 3.3.1):

$$Q_B = BF_{(A)} \times Q_{(A)}$$ **Equation 3.4.1**

EXISTING SUBAREA 401A

$Q_{(A)}$= Burned Discharge 19.70 CFS

$BF_{(A)}$ 1.270 unitless BF FOR DPA 9 (Total Area)

Q= 25.02 CFS

EXISTING SUBAREA 402A

$Q_{(A)}$= Burned Discharge 9.70 CFS

$BF_{(A)}$ 1.270 unitless BF FOR DPA 9 (Total Area)

Q= 12.32 CFS

EXISTING SUBAREA 403A

$Q_{(A)}$= Burned Discharge 9.50 CFS

$BF_{(A)}$ 1.270 unitless BF FOR DPA 9 (Total Area)

Q= 12.07 CFS

6. Proposed Bulk Flow Calculation

PROPOSED SUBAREA 314C

REFER TO EQUATION 3.4.1 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For single undeveloped watersheds (see Figure 3.3.1):

$$Q_B = BF_{(A)} \times Q_{(A)}$$ **Equation 3.4.1**

Q=Burned Discharge	7.92 CFS		
BF_A	1.270 unitless	BF FOR DPA 9 (Total Area)	
Q=	10.06 CFS		

PROPOSED SUBAREA 317D

REFER TO EQUATION 3.4.4 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For a watershed with multiple debris production zones (see Figure 3.3.4):

$$Q_B = BF_{1(A_1+A_2)} \times \left(\frac{Q \quad A_1}{A_1+A_2}\right)\left(\frac{A_1}{A_1+A_2}\right) + BF_{1(A_1)} \times \left(\frac{Q \quad A_1}{A_1+A_2}\right)\left(\frac{A_2}{A_1+A_2}\right) + BF_{2(A_1+A_2)} \times \left(\frac{Q \quad A_2}{A_1+A_2}\right)\left(\frac{A_2}{A_1+A_2}\right) + BF_{2(A_2)} \times \left(\frac{Q \quad A_2}{A_1+A_2}\right)\left(\frac{A_1}{A_1+A_2}\right)$$

Equation 3.4.4

$$Q = Q_{A_1+A_2}$$

Q=Burned Discharge	5.14	CFS	
$BF_{1(A1)}$	1.270	unitless	BF FOR DPA 9
$BF_{2(A2)}$	1.456	unitless	BF FOR DPA 5
$BF_{1(A1+A2)}$	1.270	unitless	BF FOR DPA 9 (Total Area)
$BF_{2(A1+A2)}$	1.456	unitless	BF FOR DPA 5 (Total Area)
A_1	0.0030	SQ MI	Area for DPA 9
A_2	0.0006	SQ MI	Area for DPA 5
Q=	6.68	CFS	

PROPOSED SUBAREA 318D

REFER TO EQUATION 3.4.5 IN SEDIMENTATION MANUAL-2nd EDITION MARCH 2006

For a partially developed watershed in multiple DPA zones (see Figure 3.3.5):

$$Q_B = BF_{1(A_1+A_2)}\left(\frac{Q\ (A_1 - A_{d1})}{A_1 + A_2}\right)\left(\frac{A_1 - A_{d1}}{A_1 + A_2}\right) +$$
$$BF_{1(A_1-A_{d1})}\left(\frac{Q\ (A_1 - A_{d1})}{A_1 + A_2}\right)\left(\frac{A_2 + A_{d1}}{A_1 + A_2}\right) + \left(\frac{Q\ (A_{d1})}{A_1 + A_2}\right) +$$
$$BF_{2(A_1+A_2)}\left(\frac{Q\ (A_2 - A_{d2})}{A_1 + A_2}\right)\left(\frac{A_2 - A_{d2}}{A_1 + A_2}\right) +$$
$$BF_{2(A_2-A_{d2})}\left(\frac{Q\ (A_2 - A_{d2})}{A_1 + A_2}\right)\left(\frac{(A_1 + A_{d2})}{A_1 + A_2}\right) + \left(\frac{Q\ (A_{d2})}{A_1 + A_2}\right)$$

Equation 3.4.5

Q=Burned Discharge	22.38	CFS	
$BF_{1(A1+A2)}$	1.270	unitless	BF FOR DPA 9 (Total Area)
$BF_{2(A1+A2)}$	1.456	unitless	BF FOR DPA 5 (Total Area)
$BF_{1(A1-Ad1)}$	1.270	unitless	BF FOR DPA 9 (Total Undeveloped Area)
$BF_{2(A2-Ad2)}$	1.456	unitless	BF FOR DPA 5 (Total Undeveloped Area)
A_1	0.0036	SQ MI	Area for DPA 9
A_2	0.0142	SQ MI	Area for DPA 5
A_{d1}	0.0012	SQ MI	Developed Area for DPA 9
A_{d2}	0.0038	SQ MI	Developed Area for DPA 5
Q=	29.16	CFS	

7. Existing Modified Rational Method Hydrology Clear Results (50-YR)

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
101	1A	12.1	14.56	12.1	14.56	0	0.	.00000	.00	.00	0.	20	13	A29	.02
101	2A	.0	.00	12.1	14.56	0	0.	.00000	.00	.00	0.	20	99	A29	.00

CHANNEL CONVEYANCE TYPE DEFINITION FOR VALENCIA COMMERCE CENTER DCR	
Conv Type	Definition
2	Valley Channel
4	Circular Pipe
5	Rectangular

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

EXISTING CONDITION - DRAINAGE AREA 200 STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	1A	40.5	29.27	40.5	29.27	0	0.	.00000	.00	.00	0.	20	27	A29	.01
201	2A	12.5	22.03	12.5	22.03	0	0.	.00000	.00	.00	0.	20	7	A29	.01
201	3B	.7	.94	.7	.94	0	0.	.00000	.00	.00	0.	20	11	A29	.01
201	4C	2.1	2.02	2.1	2.02	0	0.	.00000	.00	.00	0.	20	18	A29	.01

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

EXISTING DRAINAGE CONDITION - AREA 300 STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
301	1A	2.7	7.05	2.7	7.05	0	0.	.00000	.00	.00	0.	97	5	A29	.01
301	2A	13.4	31.18	13.4	31.18	0	0.	.00000	.00	.00	0.	97	6	A29	.01
301	3A	11.6	20.49	11.6	20.49	0	0.	.00000	.00	.00	0.	97	10	A29	.01
301	4B	2.3	4.90	2.3	4.90	0	0.	.00000	.00	.00	0.	97	7	A29	.01
301	5B	15.0	26.50	15.0	26.50	0	0.	.00000	.00	.00	0.	97	10	A29	.01
301	6B	27.7	46.14	27.7	46.14	0	0.	.00000	.00	.00	0.	97	11	A29	.01
301	7B	20.0	35.24	20.0	35.24	0	0.	.00000	.00	.00	0.	20	7	A29	.01

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

EXISTING CONDITION FOR WATERSHED 400 STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
401	1A	17.7	17.64	17.7	17.64	0	0.	.00000	.00	.00	0.	20	17	A29	.01
401	2A	6.6	8.83	6.6	8.83	0	0.	.00000	.00	.00	0.	20	11	A29	.01
401	3A	5.7	8.66	5.7	8.66	0	0.	.00000	.00	.00	0.	20	9	A29	.01

8. Existing Modified Rational Method Hydrology Burn Results (50-YR)

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
101	1A	12.1	16.09	12.1	16.09	0	0.	.00000	.00	.00	0.	220	13	A29	.02
101	2A	.0	.00	12.1	16.09	0	0.	.00000	.00	.00	0.	20	99	A29	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

EXISTING CONDITION - DRAINAGE AREA 200 — STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
201	1A	40.5	33.36	40.5	33.36	0	0.	.00000	.00	.00	0.	220	27	A29	.01
201	2A	12.5	23.95	12.5	23.95	0	0.	.00000	.00	.00	0.	220	7	A29	.01
201	3B	.7	1.03	.7	1.03	0	0.	.00000	.00	.00	0.	220	11	A29	.01
201	4C	2.1	2.26	2.1	2.26	0	0.	.00000	.00	.00	0.	220	18	A29	.01

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

EXISTING DRAINAGE CONDITION - AREA 300 STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
301	1A	2.7	7.37	2.7	7.37	0	0.	.00000	.00	.00	0.	297	5	A29	.01
301	2A	13.4	32.65	13.4	32.65	0	0.	.00000	.00	.00	0.	297	6	A29	.01
301	3A	11.6	21.58	11.6	21.58	0	0.	.00000	.00	.00	0.	297	10	A29	.01
301	4B	2.3	5.14	2.3	5.14	0	0.	.00000	.00	.00	0.	297	7	A29	.01
301	5B	15.0	27.91	15.0	27.91	0	0.	.00000	.00	.00	0.	297	10	A29	.01
301	6B	27.7	48.67	27.7	48.67	0	0.	.00000	.00	.00	0.	297	11	A29	.01
301	7B	20.0	38.33	20.0	38.33	0	0.	.00000	.00	.00	0.	220	7	A29	.01

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

EXISTING CONDITION FOR WATERSHED 400 STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
401	1A	17.7	19.74	17.7	19.74	0	0.	.00000	.00	.00	0.	220	17	A29	.01
401	2A	6.6	9.72	6.6	9.72	0	0.	.00000	.00	.00	0.	220	11	A29	.01
401	3A	5.7	9.47	5.7	9.47	0	0.	.00000	.00	.00	0.	220	9	A29	.01

9. Proposed Modified Rational Method Hydrology Clear Results (50-YR)

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

PROPOSED CONDITION - WATERSHED "100" STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
100	1A	12.1	25.02	12.1	25.02	4	179.	.01000	3.00	.00	0.	20	11	A29	.91
100	2A	.0	.00	12.1	25.02	0	0.	.00000	.00	.00	0.	20	99	A29	.00

CHANNEL CONVEYANCE TYPE DEFINITION FOR VALENCIA COMMERCE CENTER DCR	
Conv Type	Definition
2	Valley Channel
4	Circular Pipe
5	Rectangular

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

PROPOSED CONDITION - WATERSHED 200 STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
200	1A	27.5	56.86	27.5	56.86	4	183.	.01000	3.50	.00	0.	20	11	A29	.91
200	2A	2.8	7.12	30.3	63.83	4	1730.	.01000	4.00	.00	0.	20	7	A29	.91
200	3A	13.1	39.81	43.4	79.25	4	620.	.01000	4.00	.00	0.	20	5	A29	.91
200	4A	3.9	7.19	47.3	86.05	4	206.	.01000	4.00	.00	0.	20	14	A29	.91
200	5A	.0	.00	47.3	85.86	0	0.	.00000	.00	.00	0.	20	99	A29	.00
200	6B	.4	.65	.4	.65	4	475.	.01000	2.00	.00	0.	20	8	A29	.02
200	7C	1.5	1.40	1.5	1.40	4	941.	.01000	2.00	.00	0.	20	19	A29	.02
200	8D	.5	.63	.5	.63	0	0.	.00000	.00	.00	0.	20	12	A29	.02
200	9D	1.7	2.29	1.7	2.29	2	578.	.01000	.00	.00	0.	20	11	A29	.02
200	10D	2.7	2.52	2.7	2.52	0	0.	.00000	.00	.00	0.	20	19	A29	.02
200	11E	1.0	1.95	1.0	1.95	0	0.	.00000	.00	.00	0.	20	6	A29	.02

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

PROPOSED CONDITIONS - WATERSHET 300 STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
300	1A	2.0	4.66	2.0	4.66	0	0.	.00000	.00	.00	0.	97	6	A29	.02
300	2A	.9	2.77	2.9	7.43	0	0.	.00000	.00	.00	0.	97	5	A29	.91
300	3A	.0	.00	2.9	7.43	4	407.	.01000	2.00	.00	0.	97	99	A29	.00
300	4A	1.0	2.78	3.9	9.58	4	67.	.01000	2.00	.00	0.	97	6	A29	.91
300	5B	12.2	29.60	12.2	29.60	4	166.	.01000	2.00	.00	0.	97	8	A29	.91
300	6AB	12.2	29.52	16.1	38.92	4	584.	.01000	3.00	.00	0.	97	0	A29	.00
300	7A	10.5	27.07	26.6	64.01	4	516.	.01000	3.00	.00	0.	97	7	A29	.91
300	8A	17.2	39.60	43.8	100.14	4	71.	.01000	4.00	.00	0.	97	9	A29	.91
300	9A	3.2	6.19	47.0	106.14	4	42.	.01000	4.00	.00	0.	97	13	A29	.91
300	10A	5.9	16.41	52.9	118.20	4	176.	.01000	4.00	.00	0.	97	6	A29	.91
300	11A	5.6	7.54	58.5	125.51	4	41.	.01000	4.00	.00	0.	97	16	A29	.02
300	12A	.0	.00	58.5	125.44	0	0.	.00000	.00	.00	0.	20	99	A29	.00
300	13C	2.6	6.81	2.6	6.81	0	0.	.00000	.00	.00	0.	97	5	A29	.02
300	14C	2.9	7.58	5.5	14.38	4	177.	.02000	2.00	.00	0.	97	5	A29	.01
300	15C	.0	.00	5.5	13.53	0	0.	.00000	.00	.00	0.	20	99	A29	.00
300	16AC	5.5	13.53	64.0	135.22	0	0.	.00000	.00	.00	0.	97	0	A29	.00
300	17D	2.3	4.90	2.3	4.90	0	0.	.00000	.00	.00	0.	97	7	A29	.01
300	18D	11.4	21.29	13.7	26.19	4	133.	.02000	2.00	.00	0.	97	9	A29	.02
300	19D	.0	.00	13.7	26.18	0	0.	.00000	.00	.00	0.	20	99	A29	.00
300	20E	14.6	17.76	14.6	17.76	0	0.	.00000	.00	.00	0.	97	19	A29	.02
300	21DE	14.6	17.76	28.3	43.75	0	0.	.00000	.00	.00	0.	20	0	A29	.00
300	22AD	28.3	43.75	92.3	178.84	0	0.	.00000	.00	.00	0.	20	0	A29	.00

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

VCC 400 WAHERSHED - PROPOSED CONDITION STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
401	1A	17.6	33.55	17.6	33.55	4	420.	.01000	3.00	.00	0.	20	13	A29	.91
401	2A	1.8	4.09	19.4	37.42	4	65.	.01000	8.50	.00	0.	20	9	A29	.91
401	3A	1.5	4.56	20.9	40.68	4	120.	.01000	8.50	.00	0.	20	5	A29	.91
401	4A	2.4	7.29	23.3	45.95	4	65.	.01000	8.50	.00	0.	20	5	A29	.91
401	5A	3.3	2.78	26.6	48.69	5	214.	.01000	20.00	.00	0.	20	22	A29	.02
401	6A	.0	.00	26.6	48.40	0	0.	.00000	.00	.00	0.	20	99	A29	.00
401	7B	1.1	3.34	1.1	3.34	4	84.	.01000	2.00	.00	0.	20	5	A29	.91
401	8B	1.6	2.62	2.7	5.81	0	0.	.00000	.00	.00	0.	20	8	A29	.02
401	9B	1.5	2.93	4.2	8.74	4	112.	.01000	2.00	.00	0.	20	6	A29	.02
401	10B	.0	.00	4.2	8.69	0	0.	.00000	.00	.00	0.	20	99	A29	.00
401	11AB	4.2	8.69	30.8	56.33	0	0.	.00000	.00	.00	0.	20	0	A29	.00

10. Proposed Modified Rational Method Hydrology Burn Results (50-YR)

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

PROPOSED CONDITION - WATERSHED 200 STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
200	1A	27.5	56.86	27.5	56.86	4	183.	.01000	3.50	.00	0.	20	11	A29	.91
200	2A	2.8	7.12	30.3	63.83	4	1730.	.01000	4.00	.00	0.	20	7	A29	.91
200	3A	13.1	39.81	43.4	79.25	4	620.	.01000	4.00	.00	0.	20	5	A29	.91
200	4A	3.9	7.19	47.3	86.05	4	206.	.01000	4.00	.00	0.	20	14	A29	.91
200	5A	.0	.00	47.3	85.86	0	0.	.00000	.00	.00	0.	20	99	A29	.00
200	6B	.4	.65	.4	.65	4	475.	.01000	2.00	.00	0.	20	8	A29	.02
200	7C	1.5	1.40	1.5	1.40	4	941.	.01000	2.00	.00	0.	20	19	A29	.02
200	8D	.5	.63	.5	.63	0	0.	.00000	.00	.00	0.	20	12	A29	.02
200	9D	1.7	2.52	1.7	2.52	2	578.	.01000	.00	.00	0.	220	11	A29	.02
200	10D	2.7	2.52	2.7	2.52	0	0.	.00000	.00	.00	0.	20	19	A29	.02
200	11E	1.0	1.95	1.0	1.95	0	0.	.00000	.00	.00	0.	20	6	A29	.02

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50 SOIL DATA FILE: C:\civild\scr_soilx_34.dat

PROPOSED CONDITIONS - WATERSHET 300 STORM DAY 4

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	RAIN ZONE	PCT IMPV
300	1A	2.0	4.66	2.0	4.66	0	0.	.00000	.00	.00	0.	97	6	A29	.02
300	2A	.9	2.77	2.9	7.43	0	0.	.00000	.00	.00	0.	97	5	A29	.91
300	3A	.0	.00	2.9	7.43	4	407.	.01000	2.00	.00	0.	97	99	A29	.00
300	4A	1.0	2.78	3.9	9.58	4	67.	.01000	2.00	.00	0.	97	6	A29	.91
300	5B	12.2	29.60	12.2	29.60	4	166.	.01000	2.00	.00	0.	97	8	A29	.91
300	6AB	12.2	29.52	16.1	38.92	4	584.	.01000	3.00	.00	0.	97	0	A29	.00
300	7A	10.5	27.07	26.6	64.01	4	516.	.01000	3.00	.00	0.	97	7	A29	.91
300	8A	17.2	39.60	43.8	100.14	4	71.	.01000	4.00	.00	0.	97	9	A29	.91
300	9A	3.2	6.19	47.0	106.14	4	42.	.01000	4.00	.00	0.	97	13	A29	.91
300	10A	5.9	16.41	52.9	118.20	4	176.	.01000	4.00	.00	0.	97	6	A29	.91
300	11A	5.6	7.54	58.5	125.51	4	41.	.01000	4.00	.00	0.	97	16	A29	.02
300	12A	.0	.00	58.5	125.44	0	0.	.00000	.00	.00	0.	20	99	A29	.00
300	13C	2.6	6.81	2.6	6.81	0	0.	.00000	.00	.00	0.	97	5	A29	.02
300	14C	2.9	7.92	5.5	14.72	4	177.	.02000	2.00	.00	0.	297	5	A29	.01
300	15C	.0	.00	5.5	13.86	0	0.	.00000	.00	.00	0.	20	99	A29	.00
300	16AC	5.5	13.86	64.0	135.51	0	0.	.00000	.00	.00	0.	97	0	A29	.00
300	17D	2.3	5.14	2.3	5.14	0	0.	.00000	.00	.00	0.	297	7	A29	.01
300	18D	11.4	22.38	13.7	27.52	4	133.	.02000	2.00	.00	0.	297	9	A29	.02
300	19D	.0	.00	13.7	27.51	0	0.	.00000	.00	.00	0.	20	99	A29	.00
300	20E	14.6	17.76	14.6	17.76	0	0.	.00000	.00	.00	0.	97	19	A29	.02
300	21DE	14.6	17.76	28.3	45.08	0	0.	.00000	.00	.00	0.	20	0	A29	.00
300	22AD	28.3	45.08	92.3	180.46	0	0.	.00000	.00	.00	0.	20	0	A29	.00

11. Existing Conditions Hydrologic Summary

VCC Existing Condition

Subarea	Soil Type	% Imp	DPA	Area (Ac)	ΣAREA (Ac)	50-Yr Isohyet (in)	50-Yr Tc (min)	50-Yr Flow (cfs)	ΣQ50 (cfs)	Qb (cfs)	ΣQb (cfs)	Q50bb (cfs)	DPV (cy)
101A	20	0.02	9	12.1	12.1	5.8	13	14.6	14.6	16.1	16.1	20.3	311.9
201A	20	0.01	9	40.5	40.5	5.8	27	29.3	29.3	33.4	33.4	42.4	1044.5
202A	20	0.01	9	12.5	12.5	5.8	7	22.0	22.0	24.0	24.0	30.4	321.8
203B	20	0.01	9	0.7	0.7	5.8	11	0.9	0.9	1.0	1.0	1.3	18.2
204C	20	0.01	9	2.1	2.1	5.8	18	2.0	2.0	2.3	2.3	2.9	54.5
301A	97	0.01	9	2.7	2.7	5.8	5	7.1	7.1	7.4	7.4	9.4	69.3
302A	97	0.01	5&9	13.4	13.4	5.8	6	31.2	31.2	32.7	32.7	41.7	390.7
303A	97	0.01	5&9	11.6	11.6	5.8	10	20.5	20.5	21.6	21.6	28.9	724.4
304B	97	0.01	5&9	2.3	2.3	5.8	7	4.9	4.9	5.1	5.1	6.7	98.7
305B	97	0.01	5&9	15	15	5.8	10	26.5	26.5	27.9	27.9	39.5	1556.9
306B	97	0.01	5&9	27.7	27.7	5.8	11	46.1	46.1	48.7	48.7	70.8	3531.0
307B	20	0.01	5&9	20	20	5.8	7	35.2	35.2	38.3	38.3	49.0	613.1
401A	20	0.01	9	17.7	17.7	5.8	17	17.6	17.6	19.7	19.7	25.0	457.1
402A	20	0.01	9	6.6	6.6	5.8	11	8.8	8.8	9.7	9.7	12.3	170.0
403A	20	0.01	9	5.7	5.7	5.8	9	8.7	8.7	9.5	9.5	12.1	146.9

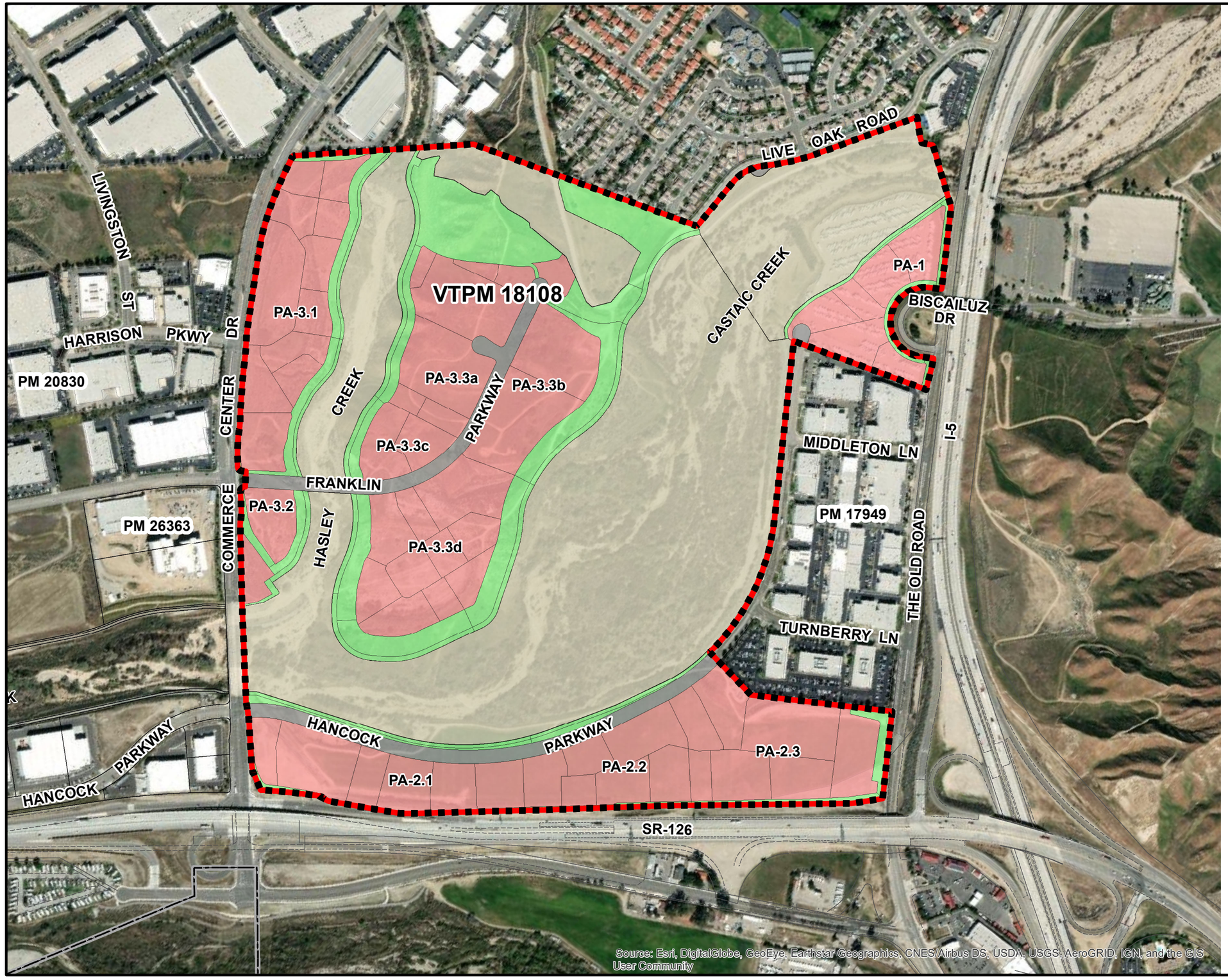
12. Proposed Conditions Hydrologic Summary

VCC Proposed Condition

Subarea	Node	Soil Type	% Imp	Area (Ac)	ΣAREA (Ac)	50-Yr Isohyet (in)	50-Yr Tc (min)	50-Yr Flow (cfs)	ΣQ50 (cfs)	Qb (cfs)	ΣQb(cfs)	Q50bb (cfs)	ΣDPV (cy)	Qcap (cfs)	ΣQcap (cfs)	Design ΣQcap (cfs)	Notes
101A		20	0.91	12.1	12.1	5.8	11	25.0	25.0					25.0	25.0		
	102A				12.1				25.0						25.0		
201A		20	0.91	27.5	27.5	5.8	11	56.9	56.9					56.9	56.9		
202A		20	0.91	2.8	30.3	5.8	7	7.1	63.8					7.1	63.8		
203A		20	0.91	13.1	43.4	5.8	5	39.8	79.3					39.8	79.3		
204A		20	0.91	3.9	47.3	5.8	14	7.2	86.1					7.2	86.1		
	205A				47.3				85.9						85.9		
206B		20	0.02	0.4	0.4	5.8	8	0.7	0.7					0.7	0.7		
207C		20	0.02	1.5	1.5	5.8	19	1.4	1.4					1.4	1.4		
208D		20	0.02	0.5	0.5	5.8	12	0.6	0.6					0.6	0.6		
209D		20	0.02	1.7	1.7	5.8	11	2.3	2.3	2.5	2.5			2.5	2.5		
210D		20	0.02	2.7	2.7	5.8	19	2.5	2.5					2.5	2.5		
211E		20	0.02	1.0	1.0	5.8	6	2.0	2.0					2.0	2.0		
301A		97	0.02	2.0	2.0	5.8	6	4.7	4.7					4.7	4.7		
302A		97	0.91	0.9	2.9	5.8	5	2.8	7.4					2.8	7.4		
	303A				2.9				7.4						7.4		
304A		97	0.91	1.0	3.9	5.8	6	2.8	9.6					2.8	9.6		
305B		97	0.91	12.2	12.2	5.8	8	29.6	29.6					29.6	29.6		
	306AB				16.1				38.9						38.9		
307A		97	0.91	10.5	26.6	5.8	7	27.1	64.0					27.1	64.0		
308A		97	0.91	17.2	43.8	5.8	9	39.6	100.1					39.6	100.1		
309A		97	0.91	3.2	47.0	5.8	13	6.2	106.1					6.2	106.1		
310A		97	0.91	5.9	52.9	5.8	6	16.4	118.2					16.4	118.2		
311A		97	0.02	5.6	58.5	5.8	16	7.5	125.5					7.5	125.7		
	312A				58.5				125.4						125.4		
313C		97	0.02	2.6	2.6	5.8	5	6.8	6.8					6.8	6.8		
314C		97	0.01	2.9	5.5	5.8	5	7.6	14.4	7.9	14.7	10.1	74.3	10.1	16.9		ΣQcap is the summation of 313C Qcap and 314C Qcap.
	315C				5.5				13.5		13.9	10.1	74.3		16.9		ΣQcap is the summation of 313C Qcap and 314C Qcap.
	316AC				64.0				135.2		135.5	10.1	74.3		142.3		ΣQcap is the summation of 312A Qcap and 315C Qcap.
317D		97	0.01	2.3	2.3	5.8	7	4.9	4.9	5.1	5.1	6.7	98.7	6.7	6.7		
318D		97	0.02	11.4	13.7	5.8	9	21.3	26.2	22.4	27.5	29.2	892.4	29.2	35.8		
	319D				13.7				26.2		27.5		991.1		27.5		ΣQcap is value of ΣQb due to the outlet being downstream of the debris catchment area.
320E		97	0.02	14.6	14.6	5.8	19	17.8	17.8					17.8	17.8		
	321DE				28.3				43.8		45.1		991.1		45.3		ΣQcap is the summation of 319D Qcap and 320E Qcap.
	322AD				92.3				178.8		180.5		1,065.4		187.6		ΣQcap is the summation of 316AC Qcap and 321DE Qcap.
400	A															1283.0	Design ΣQcap is per existing 102" Storm Drain Line "D" per PD 2298 Unit II (Qdesign= 1283.0 cfs)
401A		20	0.91	17.6	17.6	5.8	13	33.6	33.6					33.6	33.6	1316.6	Design ΣQcap is the summation of 401A ΣQcap and Node A Design ΣQcap
	B															125.0	Design ΣQcap is per existing 48" Storm Drain Line "C" per PD 2298 Unit II (Qdesign= 125.0 cfs)
402A		20	0.91	1.8	19.4	5.8	9	4.1	37.4					4.1	37.4	1445.4	Design ΣQcap is the summation of 402A ΣQcap and Design ΣQcap for Noda A and B
403A		20	0.91	1.5	20.9	5.8	5	4.6	40.7					4.6	40.7	1448.7	Design ΣQcap is the summation of 403A ΣQcap and Design ΣQcap for Noda A and B
404A		20	0.91	2.4	23.3	5.8	5	7.3	46.0					7.3	46.0	1454.0	Design ΣQcap is the summation of 404A ΣQcap and Design ΣQcap for Noda A and B
405A		20	0.02	3.3	26.6	5.8	22	2.8	48.7					2.8	48.7	1456.7	Design ΣQcap is the summation of 405A ΣQcap and Design ΣQcap for Noda A and B
	406A				26.6				48.4						48.4	1456.4	Design ΣQcap is the summation of 406A ΣQcap and Design ΣQcap for Noda A and B
407B		20	0.91	1.1	1.1	5.8	5	3.3	3.3					3.3	3.3		
408B		20	0.02	1.6	2.7	5.8	8	2.6	5.8					2.6	5.8		
409B		20	0.02	1.5	4.2	5.8	6	2.9	8.7					2.9	8.7		
	410B				4.2				8.7						8.7		
	411AB				30.8				56.3						56.3	1464.3	Design ΣQcap is the summation of 411AB ΣQcap and Design ΣQcap for Noda A and B

13. Valencia Commerce Center Land Use

VALENCIA COMMERCE CENTER VTPM 18108 Land Use



Legend

- PROJECT SITE
- VTPM 18108 BOUNDARY

Land Use

- COMMERCIAL BUSINESS PARK
- OPEN SPACE
- OPEN SPACE NATURAL
- PUBLIC ROAD

600 300 0 600 Feet

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
26074 Avenue Hall, Suite 23 • Valencia, CA 91355 • PH: (661) 294-2211 • FX: (661) 294-9890

DATE: 04/06/2020
JOB#:0015-035-036

REVISED ON: 08/25/2022
SHEET 1 OF 1

FIVEPOINT

G:\Newhall Ranch\18108 VCCE\exh\HCC098_VTPM 18108 Land Use-Aerial.mxd

14. Conveyance Lengths Exhibit

PROJECT SITE

VICINITY MAP
NOT TO SCALE

LEGEND:

- BOUNDARY LINE
- PROPOSED WATERSHED AREA
- PROPOSED OFFSITE WATERSHED AREA
- PROPOSED SUBAREA BOUNDARY
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- 1100 ROUGH GRADING CONTOUR
- EXISTING STORM DRAIN CATCH BASIN
- EXISTING STORM DRAIN OUTLET
- PROPOSED STORM DRAIN CATCH BASIN
- PROPOSED STORM DRAIN OUTLET
- 308B 13.2C Tc=9 — SUBAREA NODE / ACREAGE / TIME OF CONCENTRATION

LIME OAK ROAD
CASTAIC CREEK
BISCAILUZ DR (EXIST)
INTERSTATE 5
THE OLD ROAD (EXISTING)
MURFIELD LANE (EXISTING)
HANCOCK PARKWAY (EXISTING)
TURNBERRY LANE (EXISTING)
THE OLD ROAD (EXISTING)
HASLEY CREEK
FRANKLIN PKWY (EXIST)
COMMERCE CENTER DRIVE (EXISTING)
HARRISON PKWY (EXIST)
HANCOCK PARKWAY (PUBLIC)
SR-126

101A 12.1 AC Tc=11
316D 2.3 AC Tc=7
314C 2.9 AC Tc=5
317D 1.4 AC Tc=9
313C 2.6 AC Tc=5
302A 0.9 AC Tc=5
301A 2.0 AC Tc=6
304A 1.0 AC Tc=6
307A 10.5 AC Tc=7
319E 14.6 AC Tc=19
305B 12.2 AC Tc=8
309A 3.2 AC Tc=13
310A 5.9 AC Tc=6
308A 17.2 AC Tc=9
405A 3.3 AC Tc=22
311A 5.6 AC Tc=16
401A 17.6 AC Tc=13
404A 2.4 AC Tc=5
402A 1.8 AC Tc=9
403A 1.5 AC Tc=5
407B 1.1 AC Tc=5
408B 1.6 AC Tc=8
409B 1.5 AC Tc=6
211E 1.0 AC Tc=6
201A 27.5 AC Tc=11
207C 1.5 AC Tc=19
210D 2.7 AC Tc=19
202A 2.8 AC Tc=7
209D 1.7 AC Tc=11
206B 0.4 AC Tc=6
203A 13.1 AC Tc=5
204A 3.9 AC Tc=14
208D 0.5 AC Tc=12

SUBAREA 101A CONV LENGTH=179' CONV SLOPE=0.01
SUBAREA 316D CONV LENGTH=1,331' CONV SLOPE=0.05
SUBAREA 317D CONV LENGTH=133' CONV SLOPE=0.02
SUBAREA 314C CONV LENGTH=177' CONV SLOPE=0.02
SUBAREA 303A CONV LENGTH=407' CONV SLOPE=0.01
SUBAREA 304A CONV LENGTH=67' CONV SLOPE=0.01
SUBAREA 305A CONV LENGTH=166' CONV SLOPE=0.01
NODE 306AB CONV LENGTH=584' CONV SLOPE=0.01
SUBAREA 307A CONV LENGTH=516' CONV SLOPE=0.01
SUBAREA 309A CONV LENGTH=42' CONV SLOPE=0.01
SUBAREA 311A CONV LENGTH=41' CONV SLOPE=0.01
SUBAREA 308A CONV LENGTH=71' CONV SLOPE=0.01
SUBAREA 310A CONV LENGTH=176' CONV SLOPE=0.01
SUBAREA 404A CONV LENGTH=65' CONV SLOPE=0.01
SUBAREA 405A CONV LENGTH=214' CONV SLOPE=0.01
SUBAREA 401A CONV LENGTH=420' CONV SLOPE=0.01
SUBAREA 403A CONV LENGTH=120' CONV SLOPE=0.01
SUBAREA 402A CONV LENGTH=65' CONV SLOPE=0.01
SUBAREA 407B CONV LENGTH=84' CONV SLOPE=0.01
SUBAREA 409B CONV LENGTH=112' CONV SLOPE=0.01
SUBAREA 201A CONV LENGTH=183' CONV SLOPE=0.01
SUBAREA 207C CONV LENGTH=241' CONV SLOPE=0.01
SUBAREA 202A CONV LENGTH=1730' CONV SLOPE=0.01
SUBAREA 209D CONV LENGTH=578' CONV SLOPE=0.01
SUBAREA 206B CONV LENGTH=420' CONV SLOPE=0.01
SUBAREA 203A CONV LENGTH=823' CONV SLOPE=0.01
SUBAREA 204A CONV LENGTH=208' CONV SLOPE=0.01

EX. 42" RCP PER PD 1982 MAINTAINED BY LACFCD
EX. 36" RCP PER PD 2441 MAINTAINED BY LACFCD
EX. 84" RCP PER PD 2441 MAINTAINED BY LACFCD
EX. 102" RCP PER PD 2298 (II) Q=1283 cfs MAINTAINED BY LACFCD
EX. 48" RCP PER PD 2298 (II) MAINTAINED BY LACFCD
EX. 48" RCP PER PD 2298 (II)
EX. 24" RCP PER PD 2298 (III) MAINTAINED BY LACFCD

NORTH

FEET 100' 50' 0 100' 200'
INCHES 1 1/2 0 1 2

REGISTERED PROFESSIONAL ENGINEER JAMES R. HOSKINS No. 40695 CIVIL STATE OF CALIFORNIA
11/12/24

VALENCIA COMMERCE CENTER
CONVEYANCE LENGTHS

HUNSAKER & ASSOCIATES
LOS ANGELES, INC.
PLANNING • ENGINEERING • SURVEYING
26074 Avenue Hall, Suite #23 • Valencia, CA 91355
PH: (661) 294-9890 FX: (661) 294-2211

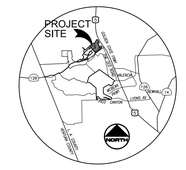
DATE: 05/04/2023 REV. DATE:
PROJECT NO: SHEET 1 OF 1

G:\Hansen\ Branch\ 18108 \PCC\Storm\Hydrology\Design Backup\VCC Conveyance Lengths.dwg Plotted on Nov 08, 2024 by simons

APPENDIX B – Hydrology Exhibits

1. Existing Hydrology Map

Subarea	Soil Type	% Imp	DPA	Area (Ac)	ΣAREA (Ac)	50-Yr Isohyet (in)	50-Yr Tc (min)	50-Yr Flow (cfs)	ΣQ50 (cfs)	Qb (cfs)	ΣQb (cfs)	Q50bb (cfs)	DPV (cy)
101A	20	0.02	9	12.1	12.1	5.8	13	14.6	14.6	16.1	16.1	20.3	311.9
201A	20	0.01	9	40.5	40.5	5.8	27	29.3	29.3	33.4	33.4	42.4	1044.5
202A	20	0.01	9	12.5	12.5	5.8	7	22.0	22.0	24.0	24.0	30.4	321.8
203B	20	0.01	9	0.7	0.7	5.8	11	0.9	0.9	1.0	1.0	1.3	18.2
204C	20	0.01	9	2.1	2.1	5.8	18	2.0	2.0	2.3	2.3	2.9	54.5
301A	97	0.01	9	2.7	2.7	5.8	5	7.1	7.1	7.4	7.4	9.4	69.3
302A	97	0.01	5&9	13.4	13.4	5.8	6	31.2	31.2	32.7	32.7	41.7	390.7
303A	97	0.01	5&9	11.6	11.6	5.8	10	20.5	20.5	21.6	21.6	28.9	724.4
304B	97	0.01	5&9	2.3	2.3	5.8	7	4.9	4.9	5.1	5.1	6.7	98.7
305B	97	0.01	5&9	15	15	5.8	10	26.5	26.5	27.9	27.9	39.5	1556.9
306B	97	0.01	5&9	27.7	27.7	5.8	11	46.1	46.1	48.7	48.7	70.8	3531.0
307B	20	0.01	5&9	20	20	5.8	7	35.2	35.2	38.3	38.3	49.0	613.1
401A	20	0.01	9	17.7	17.7	5.8	17	17.6	17.6	19.7	19.7	25.0	457.1
402A	20	0.01	9	6.6	6.6	5.8	11	8.8	8.8	9.7	9.7	12.3	170.0
403A	20	0.01	9	5.7	5.7	5.8	9	8.7	8.7	9.5	9.5	12.1	146.9



VICINITY MAP
NOT TO SCALE

LIVE OAK ROAD
CASTAIC CREEK
Q50=26,500 cfs
Q100=23,200 cfs
LIMITS OF EXISTING CONCRETE LINING PER PD 1982 MAINTAINED BY LACFCD
BOUNDARY LINE
EX. 42" RCP PER PD 1982 MAINTAINED BY LACFCD
BISCAILUZ DRIVE
INTERSTATE 5
THE OLD ROAD
MUIRFIELD LANE
HANCOCK PARKWAY
TURNBERRY LANE
EX. 36" RCP PER PD 2441 MAINTAINED BY LACFCD
EX. 84" RCP PER PD 2441 MAINTAINED BY LACFCD
LIMITS OF EXISTING RIP-RAP LINING PER PD 2441 (II) MAINTAINED BY LACFCD
EXISTING CONCRETE SLOPE LINING PER P.D. 2262
HASLEY CREEK
Q50=25,000 cfs
Q100=28,000 cfs
HARRISON PARKWAY
COMMERCE CENTER DRIVE
FRANKLIN PARKWAY
SR 126
EX. 102" RCP PER PD 2298 (II) Q=1283 cfs MAINTAINED BY LACFCD
EX. 48" RCP PER PD 2298 (II) MAINTAINED BY LACFCD
EX. 30" RCP PER PD 2563 MAINTAINED BY LACFCD
EX. 24" RCP PER PD 2298 (III) MAINTAINED BY LACFCD
EXISTING HASLEY CREEK CONCRETE/RIPRAP LINING PER PD 2298 (III) MAINTAINED BY LACFCD
EXISTING FLOW DIVERSION BERM PER PD 2298 (III) MAINTAINED BY LACFCD
EXISTING CASTAIC CREEK SOIL CEMENT BANK PROTECTION PER PD 2563 MAINTAINED BY LACFCD
EXISTING CONCRETE/RIP-RAP LINING PER PD 2298 (III) MAINTAINED BY LACFCD
EXISTING SOIL CEMENT BANK PROTECTION PER PD 2563 MAINTAINED BY LACFCD
101A — 12.1 AC — Tc=13 — A = 12.1 AC; Q50 = 14.6 cfs; ΣQ50 = 14.6 cfs; ΣQ50bb = 16.1 cfs; ΣQ50CAP = 20.3 cfs; ΣDPV= 311.9 cy
102A — 100 — ΣA = 12.1 AC; ΣQ50 = 14.6 cfs; ΣQ50b = 16.1 cfs; ΣQ50bb = 20.3 cfs; ΣQ50CAP = 20.3 cfs; ΣDPV= 311.9 cy
A = 15.0 AC; Q50 = 26.5 cfs; Q50b = 27.9 cfs; Q50bb = 39.5 cfs; DPV= 1556.9 cy
304B — 2.3 AC — Tc=7 — A = 2.3 AC; Q50 = 4.9 cfs; Q50b = 5.1 cfs; Q50bb = 6.7 cfs; DPV= 98.7 cy
305B — 15.0 AC — Tc=10
301A — 2.7 AC — Tc=5 — A = 2.7 AC; Q50 = 7.1 cfs; Q50b = 7.4 cfs; Q50bb = 9.4 cfs; DPV= 69.3 cy
306B — 27.7 AC — Tc=11 — A = 27.7 AC; Q50 = 46.1 cfs; Q50b = 48.7 cfs; Q50bb = 70.8 cfs; DPV= 3531.0 cy
302A — 13.4 AC — Tc=6 — A = 13.4 AC; Q50 = 31.2 cfs; Q50b = 32.7 cfs; Q50bb = 41.7 cfs; DPV= 390.7 cy
303A — 11.6 AC — Tc=10 — A = 11.6 AC; Q50 = 20.5 cfs; Q50b = 21.6 cfs; Q50bb = 28.9 cfs; DPV= 724.4 cy
401A — 17.7 AC — Tc=17 — A = 17.7 AC; Q50 = 17.6 cfs; Q50b = 19.7 cfs; Q50bb = 38.6 cfs; DPV= 457.1 cy
402A — 6.6 AC — Tc=11 — A = 6.6 AC; Q50 = 8.8 cfs; Q50b = 9.7 cfs; Q50bb = 17.7 cfs; DPV= 170.0 cy
403A — 5.7 AC — Tc=9 — A = 5.7 AC; Q50 = 8.7 cfs; Q50b = 9.5 cfs; Q50bb = 12.1 cfs; DPV= 146.9 cy
400 — ΣA = 30.0 AC; ΣQ50 = 35.1 cfs; ΣQ50b = 38.9 cfs; ΣQ50bb = 49.4 cfs; ΣQ50CAP = 49.4 cfs; ΣDPV=773.9 cy
300 — ΣA = 92.7 AC; ΣQ50 = 171.5 cfs; ΣQ50b = 181.7 cfs; ΣQ50bb = 245.8 cfs; ΣQ50CAP = 245.9 cfs; ΣDPV= 6984.0 cy
200 — ΣA = 53.0 AC; ΣQ50 = 51.3 cfs; ΣQ50b = 57.3 cfs; ΣQ50bb = 72.8 cfs; ΣQ50CAP = 72.8 cfs; ΣDPV= 1366.2 cy
A = 12.5 AC; Q50 = 22.0 cfs; Q50b = 24.0 cfs; Q50bb = 30.4 cfs; DPV= 321.8 cy
202A — 12.5 AC — Tc=7
A = 20.0 AC; Q50 = 35.2 cfs; Q50b = 38.3 cfs; Q50bb = 49.0 cfs; DPV= 613.1 cy
201A — 40.5 AC — Tc=27 — A = 40.5 AC; Q50 = 29.3 cfs; Q50b = 33.4 cfs; Q50bb = 42.4 cfs; DPV= 1044.5 cy
204C — 2.1 AC — Tc=8 — A = 2.1 AC; Q50 = 2.0 cfs; Q50b = 2.3 cfs; Q50bb = 2.9 cfs; DPV= 54.5 cy
203B — 0.7 AC — Tc=6 — A = 0.7 AC; Q50 = 0.9 cfs; Q50b = 1.0 cfs; Q50bb = 1.3 cfs; DPV= 18.2 cy

LEGEND:

- PHASING LIMITS
- EXISTING WATERSHED AREA AT LIMITS OF IMPROVEMENT
- EXISTING SUBAREA BOUNDARY
- EXISTING STORM DRAIN
- DRAINAGE DIRECTION
- EXISTING FLOODPLAIN (FF GOP)
- EXISTING FLOODWAY (FW GOP)
- FEMA ZONE AE (FEMA)
- 5088 / 93.42 / Tc=5 — SUBAREA NODE; ACREAGE; TIME OF CONCENTRATION
- 1250 ELEV. — GROUND ELEVATION
- 020 / 097 — SOIL CLASSIFICATION AREA
- DPA9 / DPA5 — DEBRIS POTENTIAL AREA (DPA)
- 100 — WATERSHED SUMMARY NODE
- EXISTING STORM DRAIN CATCH BASIN
- EXISTING STORM DRAIN OUTLET

DRAINAGE DESIGN CRITERIA:

1. 50-YR, 24-HR ISOHYETS: 5.8
2. SOIL TYPES: 20, 97
3. DESIGN STORM: 50-YR, 24-HR
4. PERCENT IMPERVIOUS VALUES: UNDEVELOPED 1%
5. DPA = 5, 82,000 CY PER SQ MI BULK FACTOR= 1.456
6. DPA = 9, 16,500 CY PER SQ MI BULK FACTOR= 1.270

NORTH
1" = 100' — FEET — 100' 50' 0 100' 200'
1" = 1/2' — INCHES — 1 0 1

NO.	REVISIONS	DATE	BY
	DESIGNED:		
	DRAFTED:		
	CHECKED:		

OWNER/DEVELOPER:
FIVEPOINT
25124 SPRINGFIELD COURT SUITE 300
VALENCIA, CA 91355

PLANS PREPARED BY:
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
3633 Inland Empire Blvd, Ste E • Ontario, CA 91764
ph 909 568-2900 • fax 909 568-2909
JASON H. FUKUMITSU — DATE 11/16/24

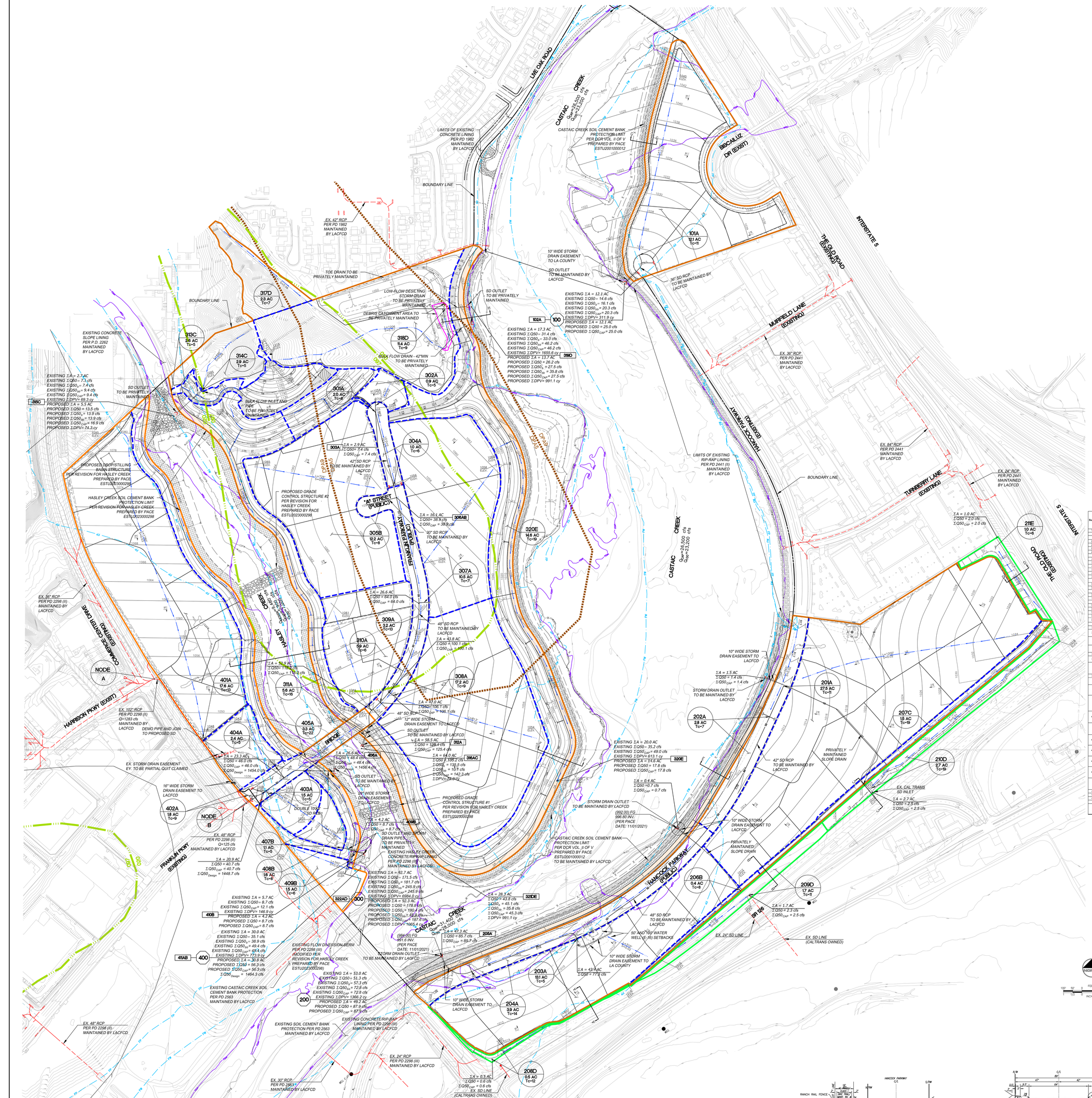
COUNTY OF LOS ANGELES

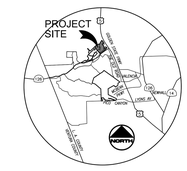
EXISTING HYDROLOGY MAP FOR
VESTING TENTATIVE PARCEL MAP 18108
ESTU2022000053
IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

SCALE: AS SHOWN
DATE: 12/05/2022
JOB No. 00715-035-036
SHEET
1 OF 1 SHEETS

Plotted: 11/16/2024 10:08 AM By: Jason Fukumitsu
Z:\Projects\00715-035-036\Engineering\Exhibits\ESTU\00715-035-036 ESTU Exhibit Hydrology.dwg

2. Proposed Hydrology Map





VICINITY MAP
NOT TO SCALE

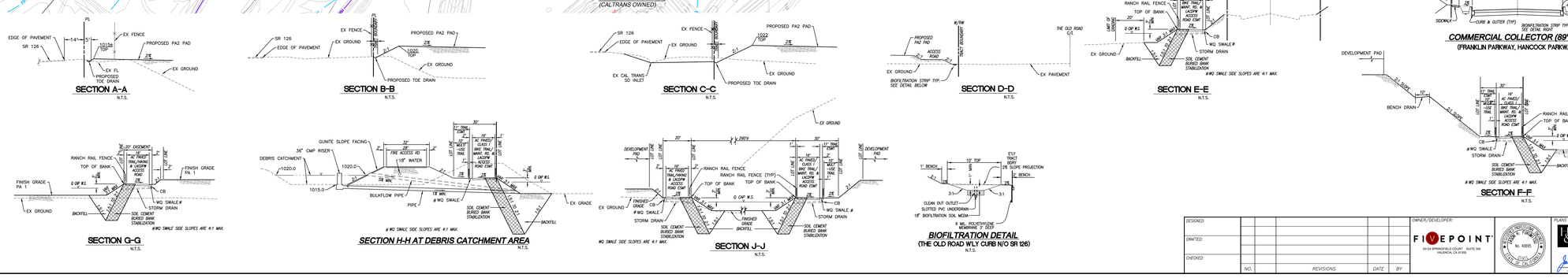
LEGEND:

- BOUNDARY LINE
- PROPOSED WATERSHED AREA TO LIMITS OF DEVELOPMENT
- PROPOSED OFFSITE WATERSHED AREA
- PROPOSED SUBAREA BOUNDARY
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- DEBRIS LIMIT
- STORM DRAIN EASEMENT
- TIME OF CONCENTRATION PATH
- FEMA ZONE AE
- EXISTING FLOODPLAIN
- EXISTING FLOODWAY
- EXISTING ACOE JURISDICTION LINE (PER PACE-2006)
- EXISTING CDFG JURISDICTION LINE (PER PACE-2006)
- ROUGH GRADING CONTOUR
- LOT LINE
- SOIL CLASSIFICATION AREA (020 / 097)
- DEBRIS PONTENTIAL AREA (DPA 5, DPA 9)
- PROPOSED SOIL CEMENT BANK PROTECTION
- PROPOSED LAUNCH STONE
- ACCESS ROAD
- SUBAREA NODE (509B, 52.90, Tc=5)
- ACREAGE
- TIME OF CONCENTRATION
- GROUND ELEVATION (1250 ELEV.)
- WATERSHED SUMMARY NODE (100)
- EXISTING STORM DRAIN CATCH BASIN
- EXISTING STORM DRAIN OUTLET
- PROPOSED STORM DRAIN CATCH BASIN
- PROPOSED STORM DRAIN OUTLET

DRAINAGE DESIGN CRITERIA:

1. 50-YR, 24-HR ISOHYETS: 5.8
2. SOIL TYPES: 20, 97
3. DESIGN STORM: 50-YR, 24-HR
4. PERCENT IMPERVIOUS VALUES: UNDEVELOPED 1%
5. DPA = 5, 82,000 CY PER SQ MI BULK FACTOR= 1.456
6. DPA = 9, 16,500 CY PER SQ MI BULK FACTOR= 1.270

Subarea	Node	Soil Type	% Imp	Area (Ac)	ΣAREA (Ac)	50-Yr Isohyet (in)	50-Yr Tc (min)	50-Yr Flow (cfs)	ΣQ50 (cfs)	Qb (cfs)	EQ0(cfs)	Q50ds (cfs)	ΣDPV (cy)	Qcap (cfs)	ΣQcap (cfs)	Design ΣQcap (cfs)	Notes
101A		20	0.91	12.1	12.1	5.8	11	25.0	25.0					25.0	25.0		
	102A				12.1				25.0								
201A		20	0.91	27.5	27.5	5.8	11	56.9	56.9					56.9	56.9		
202A		20	0.91	2.8	30.3	5.8	7	7.1	63.8					7.1	63.8		
203A		20	0.91	13.1	43.4	5.8	5	39.8	79.3					39.8	79.3		
204A		20	0.91	3.9	47.3	5.8	14	7.2	86.1					7.2	86.1		
	205A				47.3				85.9						85.9		
206B		20	0.02	0.4	0.4	5.8	8	0.7	0.7					0.7	0.7		
207C		20	0.02	1.5	1.5	5.8	19	1.4	1.4					1.4	1.4		
208D		20	0.02	0.5	0.5	5.8	12	0.6	0.6					0.6	0.6		
209D		20	0.02	1.7	1.7	5.8	11	2.3	2.3	2.5	2.5			2.5	2.5		
210D		20	0.02	2.7	2.7	5.8	19	2.5	2.5					2.5	2.5		
211E		20	0.02	1.0	1.0	5.8	6	2.0	2.0					2.0	2.0		
301A		97	0.02	2.0	2.0	5.8	6	4.7	4.7					4.7	4.7		
302A		97	0.91	0.9	2.9	5.8	5	7.4	7.4					2.8	7.4		
	303A				2.9				7.4						7.4		
304A		97	0.91	1.0	3.9	5.8	6	2.8	9.9					2.8	9.9		
305B		97	0.91	12.2	12.2	5.8	8	29.8	29.6					29.6	29.6		
	306AB				16.1				38.9						38.9		
307A		97	0.91	10.5	26.6	5.8	7	27.1	64.0					27.1	64.0		
308A		97	0.91	17.2	43.8	5.8	9	39.8	100.1					39.8	100.1		
309A		97	0.91	3.2	47.0	5.8	13	6.2	106.1					6.2	106.1		
310A		97	0.91	5.9	52.9	5.8	6	16.4	118.2					16.4	118.2		
311A		97	0.02	5.6	58.5	5.8	16	7.5	125.5					7.5	125.7		
	312A				58.5				125.4						125.4		
313C		97	0.02	2.6	2.6	5.8	5	6.8	6.8					6.8	6.8		
314C		97	0.01	2.9	5.5	5.8	5	7.6	14.4	7.9	14.7	10.1	74.3	10.1	16.9		ΣQcap is the summation of 313C Qcap and 314C Qcap.
	315C				5.5				13.5		13.9	10.1	74.3		16.9		ΣQcap is the summation of 313C Qcap and 314C Qcap.
	316AC				94.0				135.2		135.5	10.1	74.3		142.3		ΣQcap is the summation of 312A Qcap and 315C Qcap.
317D		97	0.01	2.3	2.3	5.8	7	4.9	4.9	5.1	5.1	8.7	58.7	6.7	6.7		
318D		97	0.02	11.4	13.7	5.8	9	21.3	26.2	22.4	27.5	29.2	892.4	29.2	35.8		
	319D				13.7				26.2		27.5		991.1		27.5		ΣQcap is value of ΣQb due to the outlet being dow nstream of the debris catchment area.
320E		97	0.02	14.6	14.6	5.9	19	17.8	17.8					17.8	17.8		
	321DE				28.3				43.8		45.1		991.1		45.3		ΣQcap is the summation of 319D Qcap and 320E Qcap.
	322AD				92.3				178.8		180.5		1,065.4		187.8		ΣQcap is the summation of 316AC Qcap and 321DE Qcap.
400	A															1283.0	ΣQcap is per existing 102" Storm Drain Line "D" per PD 2298 Unit II (Qdesign= 1283.0 cfs)
401A		20	0.91	17.6	17.6	5.8	13	33.6	33.6					33.6	33.6	1316.6	Design ΣQcap is the summation of 401A ΣQcap and Node A Design ΣQcap
	B															125.0	Design ΣQcap is per existing 48" Storm Drain Line "C" per PD 2298 Unit II (Qdesign= 125.0 cfs)
402A		20	0.91	1.8	19.4	5.8	9	4.1	37.4					4.1	37.4	1445.4	Design ΣQcap is the summation of 402A ΣQcap and Design ΣQcap for Node A and B
403A		20	0.91	1.5	20.9	5.8	5	4.6	40.7					4.6	40.7	1448.7	Design ΣQcap is the summation of 403A ΣQcap and Design ΣQcap for Node A and B
404A		20	0.91	2.4	23.3	5.8	5	7.3	46.0					7.3	46.0	1454.0	Design ΣQcap is the summation of 404A ΣQcap and Design ΣQcap for Node A and B
405A		20	0.02	3.3	26.6	5.8	22	2.8	48.7					2.8	48.7	1455.7	Design ΣQcap is the summation of 405A ΣQcap and Design ΣQcap for Node A and B
	406A				26.6				48.4						48.4	1454.4	Design ΣQcap is the summation of 406A ΣQcap and Design ΣQcap for Node A and B
407B		20	0.91	1.1	1.1	5.8	5	3.3	3.3					3.3	3.3		
408B		20	0.02	1.6	2.7	5.8	8	2.8	5.8					2.8	5.8		
409B		20	0.02	1.5	4.2	5.8	6	2.9	8.7					2.9	8.7		
	410B				4.2				8.7								
	411AB				30.8				56.3						56.3	1464.3	Design ΣQcap is the summation of 411AB ΣQcap and Design ΣQcap for Node A and B



DESIGNED:	NO.	REVISIONS	DATE	BY
DRAFTED:				
CHECKED:				

OWNER/DEVELOPER: FIVEPOINT, 25124 SPRINGFIELD COURT SUITE 300 VALENCIA, CA 91355

PLANS PREPARED BY: HUNSAKER & ASSOCIATES IRVINE, INC. PLANNING • ENGINEERING • SURVEYING 9675 Jeronimo Road, Ste 125 • Irvine, CA 92618 714 641 0341 FAX 714 641 1413

JASON H. FORCHHEIMER, R.C.E. NO. 60605, EXP. 6/30/25, STATE OF CALIFORNIA — 11/14/24

COUNTY OF LOS ANGELES

PROPOSED HYDROLOGY MAP FOR VESTING TENTATIVE PARCEL MAP 18108 ESTU2022000050

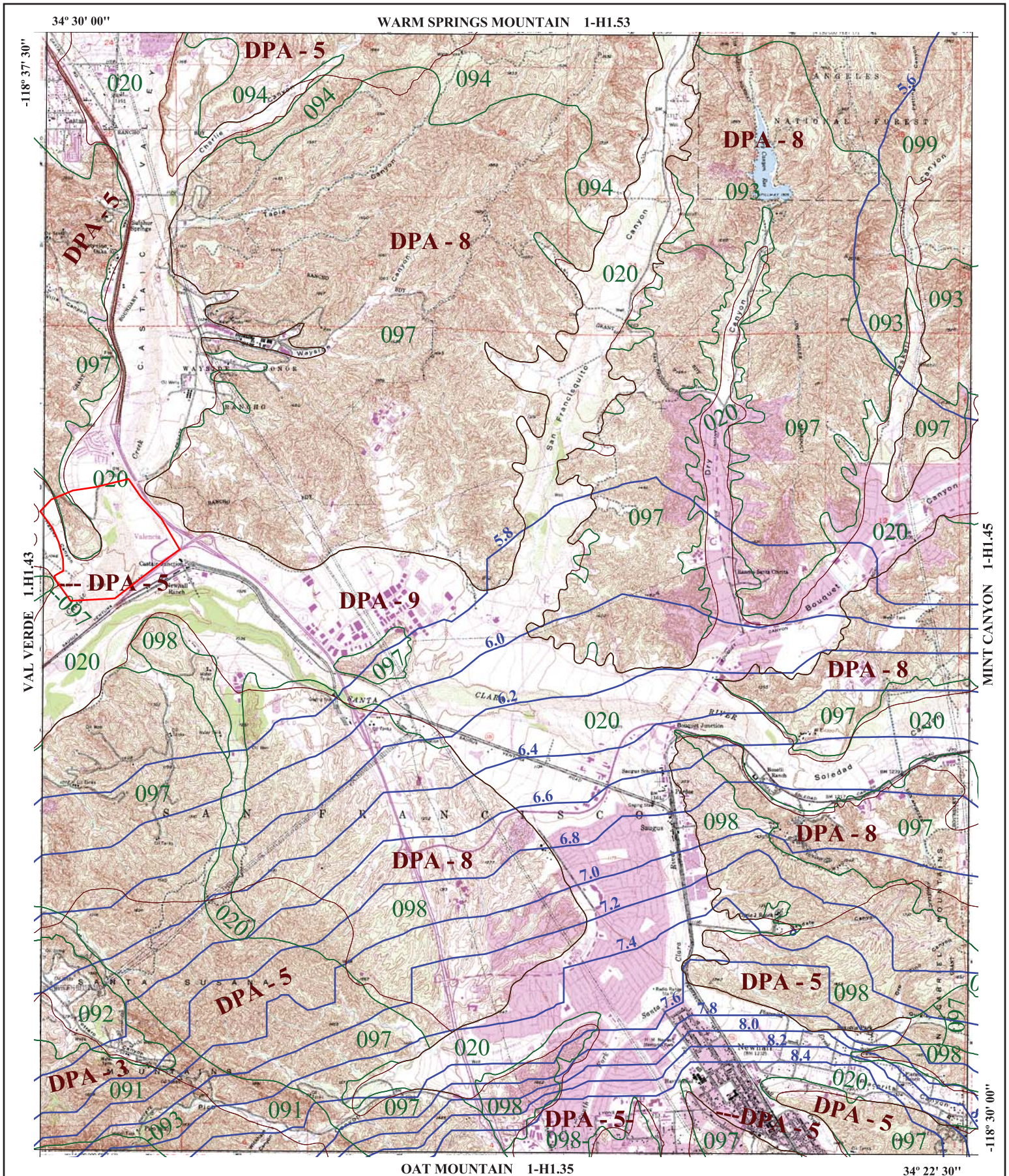
IN THE UNINCORPORATED AREA OF THE COUNTY OF LOS ANGELES, STATE OF CALIFORNIA

SCALE: AS SHOWN
DATE: 11/06/2024
T.G. NO. 0815-043-120

SHEET 1 OF 1 SHEETS

APPENDIX C – Hydrologic References

1. 50-YR, 24 ISOHYET (LACDPW)



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

N E W H A L L
50-YEAR 24-HOUR ISOHYET

1-H1.44

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

Table 6.3.3
Design Fire Factors for Use with Burned Watershed Hydrology

Watershed	Fire Factor
Santa Clara River Watershed & Antelope Valley	0.34
Los Angeles River Watershed	0.71
San Gabriel River Watershed	0.71
Coastal Watershed	0.83

Only undeveloped subareas with 15% or less imperviousness require burn calculations. Equation 6.3.3 calculates the burned runoff coefficient.

$$C_{ba} = FF \times [(1-K) \times (1-C_u)] + C_u$$ **Equation 6.3.3**

Where:
- C_{ba} = Adjusted burned soil runoff coefficient, dimensionless
- FF = Fire Factor, the effectively burned percentage of watershed area, dimensionless
- K = Ratio of burned to unburned infiltration rates for I, $0.677 \times I^{-0.102}$, dimensionless
- I = Rainfall intensity in in/hr
- C_u = Undeveloped runoff coefficient, dimensionless

The K factor represents the ratio of burned to unburned infiltration rates. The ratio varies with the rainfall intensity. Equation 6.3.4 is useful for determining the burned peak flow when an unburned flow and intensity are known.

$$Q_{ba} = FF \times [(0.677 \times I^{-0.102} - 1) \times (Q_u - A \times I)] + Q_u$$ **Equation 6.3.4**

Where:
- Q_{ba} = Peak runoff from a burned area in cfs
- FF = Fire Factor, the effectively burned percentage of watershed area
- I = Rainfall intensity in in/hr
- A = Watershed area in acres
- Q_u = Peak runoff from an unburned area in cfs

Fires increase runoff and debris production. Higher runoff rates entrain more debris and burned watersheds have more debris available for entrainment. Debris production yields as much as 120,000 cubic yards/square mile of watershed for major storms. Boulders up to eight feet in diameter have been deposited in valley areas at considerable distances from their source. Debris quantities equal in volume to the storm runoff (100 percent bulking) have been recorded in major storms. The Flood Control District and the

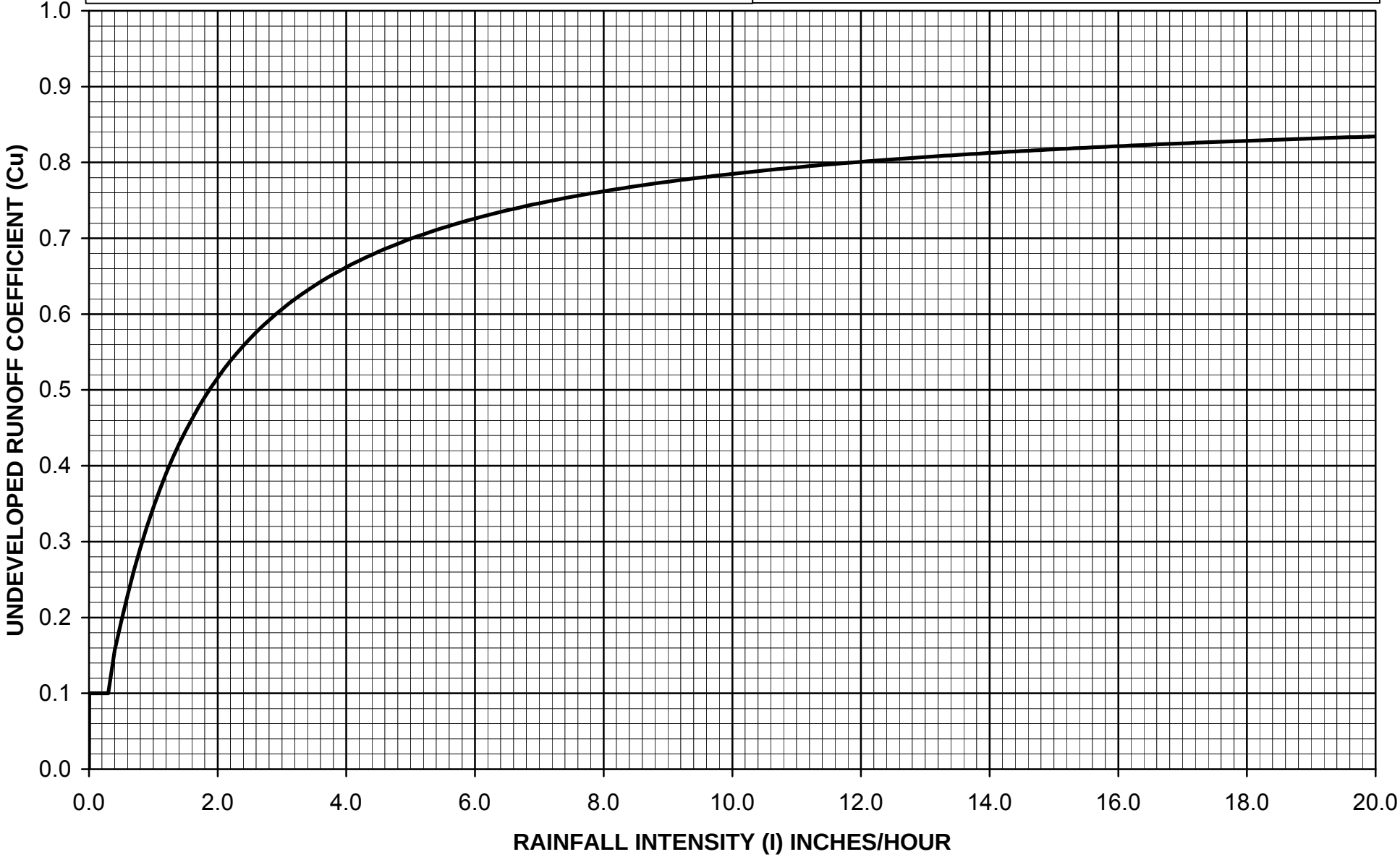
2. Runoff Coefficient Curves

$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

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. 020

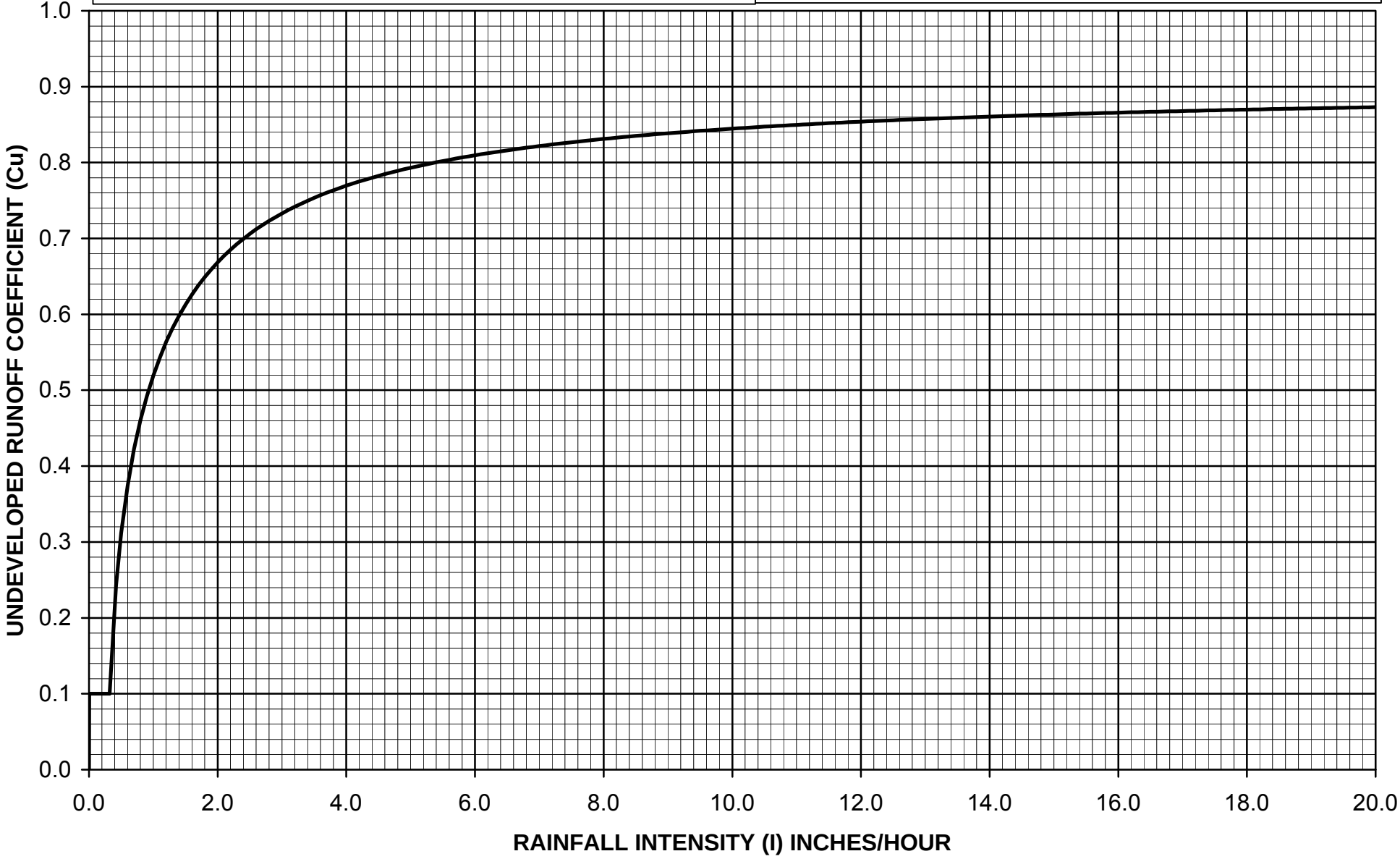


$C_D = (0.9 * IMP) + (1.0 - IMP) * C_U$

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. 097



3. Los Angeles County Proportion Impervious Data Table

Proportion Impervious Data

Code	Land Use Description	% Impervious
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

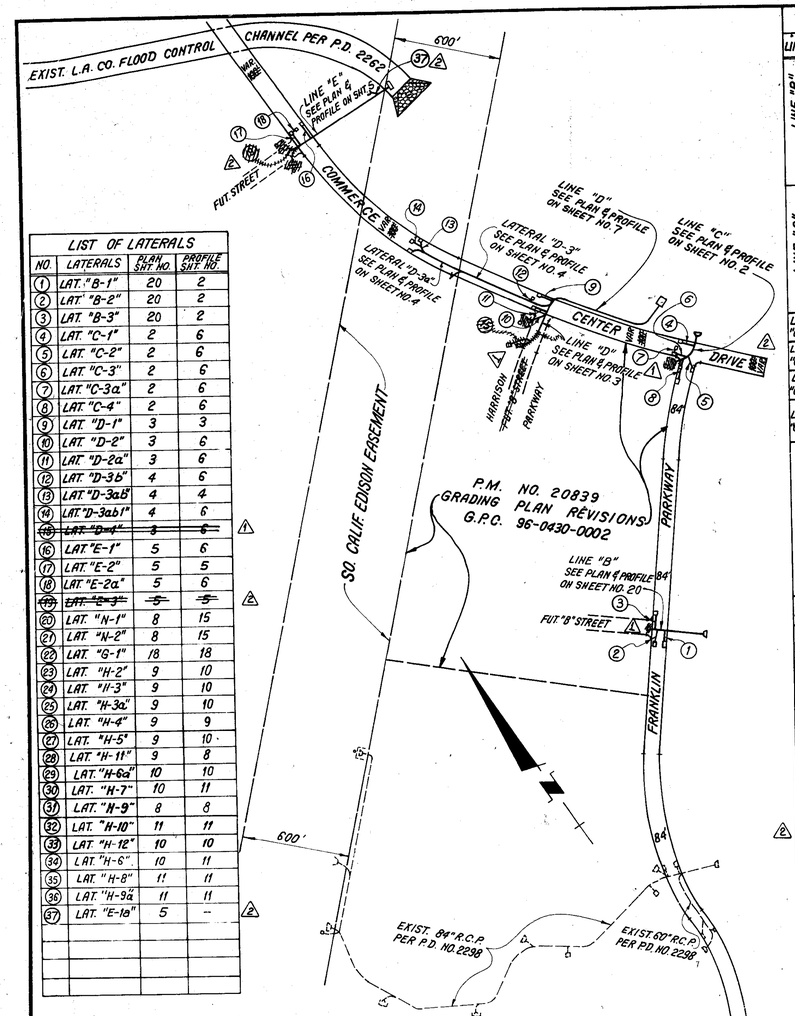
Code	Land Use Description	% Impervious
1271.03	Base Government Offices	91
1271.04	Base Fire Stations	91
1271.05	Base Non-Attended Public Parking Facilities	91
1271.06	Base Air Field	45
1271.07	Base Petroleum Refining and Processing	91
1271.08	Base Mineral Extraction - Oil and Gas	10
1271.09	Base Harbor Facilities	91
1271.10	Base Navigation Aids	47
1271.11	Base Developed Local Parks and Recreation	10
1271.12	Base Vacant Undifferentiated	1
1272	Vacant Area	2
1273	Air Field	45
1274	Former Base (Built-up Area)	65
1275	Former Base Vacant Area	2
1276	Former Base Air Field	91
1311	Manufacturing, Assembly, and Industrial Services	91
1312	Motion Picture and Television Studio Lots	82
1313	Packing Houses and Grain Elevators	96
1314	Research and Development	91
1321	Manufacturing	91
1322	Petroleum Refining and Processing	91
1323	Open Storage	66
1324	Major Metal Processing	91
1325	Chemical Processing	91
1331	Mineral Extraction - Other Than Oil and Gas	10
1332	Mineral Extraction - Oil and Gas	10
1340	Wholesaling and Warehousing	91
1411	Airports	91
1411.01	Airstrip	10
1412	Railroads	15
1412.01	Railroads-Attended Pay Public Parking Facilities	91
1412.02	Railroads-Non-Attended Public Parking Facilities	91
1412.03	Railroads-Manufacturing, Assembly, and Industrial Services	91
1412.04	Railroads-Petroleum Refining and Processing	91
1412.05	Railroads-Open Storage	66
1412.06	Railroads-Truck Terminals	91
1413	Freeways and Major Roads	91
1414	Park-and-Ride Lots	91
1415	Bus Terminals and Yards	91
1416	Truck Terminals	91
1417	Harbor Facilities	91
1418	Navigation Aids	47
1420	Communication Facilities	82
1420.01	Communication Facilities-Antenna	2

Code	Land Use Description	% Impervious
1431	Electrical Power Facilities	47
1431.01	Electrical Power Facilities-Powerlines (Urban)	2
1431.02	Electrical Power Facilities-Powerlines (Rural)	1
1432	Solid Waste Disposal Facilities	15
1433	Liquid Waste Disposal Facilities	96
1434	Water Storage Facilities	91
1435	Natural Gas and Petroleum Facilities	91
1435.01	Natural Gas and Petroleum Facilities-Manufacturing, Assembly, and In	91
1435.02	Natural Gas and Petroleum Facilities-Petroleum Refining and Processing	91
1435.03	Natural Gas and Petroleum Facilities-Mineral Extraction – Oil and Gas	10
1435.04	Natural Gas and Petroleum Facilities-Vacant Undifferentiated	1
1436	Water Transfer Facilities	96
1437	Improved Flood Waterways and Structures	100
1440	Maintenance Yards	91
1450	Mixed Transportation	90
1460	Mixed Transportation and Utility	91
1460.01	Mixed Utility and Transportation-Improved Flood Waterways and Structures	100
1460.02	Mixed Utility and Transportation-Railroads	15
1460.03	Mixed Utility and Transportation-Freeways and Major Roads	91
1500	Mixed Commercial and Industrial	91
1600	Mixed Urban	89
1700	Under Construction (Use appropriate value)	91
1810	Golf Courses	3
1821	Developed Local Parks and Recreation	10
1822	Undeveloped Local Parks and Recreation	2
1831	Developed Regional Parks and Recreation	2
1832	Undeveloped Regional Parks and Recreation	1
1840	Cemeteries	10
1850	Wildlife Preserves and Sanctuaries	2
1850.01	Wildlife-Commercial Recreation	90
1850.02	Wildlife-Other Special Use Facilities	86
1850.03	Wildlife-Developed Local Parks and Recreation	10
1860	Specimen Gardens and Arboreta	15
1870	Beach Parks	10
1880	Other Open Space and Recreation	10
2110	Irrigated Cropland and Improved Pasture Land	2
2120	Non-Irrigated Cropland and Improved Pasture Land	2
2200	Orchards and Vineyards	2
2300	Nurseries	15
2400	Dairy, Intensive Livestock, and Associated Facilities	42
2500	Poultry Operations	62
2600	Other Agriculture	42
2700	Horse Ranches	42

4. L.A.C.D.P.W. As-Built Storm Drain Plans

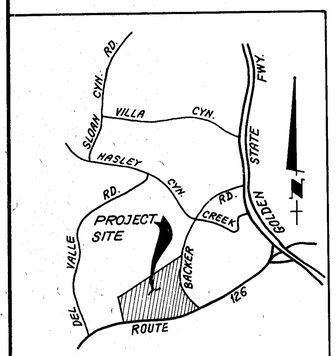
STORM DRAIN PLANS IN
P.M. NO. 22261 P.D. NO. 2298 (UNIT II)

RECEIVED
JUL 13 1999
PROCESSING CENTER
LAND DEVELOPMENT



LIST OF LATERALS			
NO.	LATERALS	PLAN SHT. NO.	PROFILE SHT. NO.
1	LAT. "B-1"	20	2
2	LAT. "B-2"	20	2
3	LAT. "B-3"	20	2
4	LAT. "C-1"	2	6
5	LAT. "C-2"	2	6
6	LAT. "C-3"	2	6
7	LAT. "C-3a"	2	6
8	LAT. "C-4"	2	6
9	LAT. "D-1"	3	3
10	LAT. "D-2"	3	6
11	LAT. "D-2a"	3	6
12	LAT. "D-3b"	4	6
13	LAT. "D-3a"	4	4
14	LAT. "D-3ab1"	4	6
15	~~LAT. "D-4"~~	~~5~~	~~6~~
16	LAT. "E-1"	5	6
17	LAT. "E-2"	5	5
18	LAT. "E-2a"	5	6
19	~~LAT. "E-3"~~	~~5~~	~~5~~
20	LAT. "N-1"	8	15
21	LAT. "N-2"	8	15
22	LAT. "G-1"	18	18
23	LAT. "H-2"	9	10
24	LAT. "H-3"	9	10
25	LAT. "H-3a"	9	10
26	LAT. "H-4"	9	9
27	LAT. "H-5"	9	10
28	LAT. "H-11"	9	8
29	LAT. "H-6a"	10	10
30	LAT. "H-7"	10	11
31	LAT. "H-9"	8	8
32	LAT. "H-10"	11	11
33	LAT. "H-12"	10	10
34	LAT. "H-6"	10	11
35	LAT. "H-8"	11	11
36	LAT. "H-9a"	11	11
37	LAT. "E-1a"	5	--

KEY MAP
SCALE: 1"= 400'



VICINITY MAP
NOT TO SCALE
T.G. 123-D4

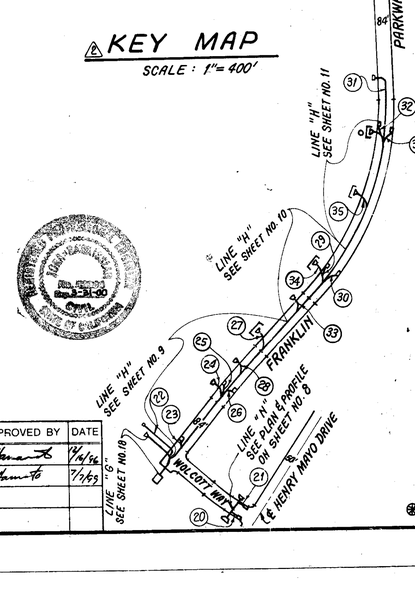
NO	REVISION	REV. R.C.E. NO.	APPROVED BY	DATE
1	DELETED DEBRIS BASIN @ END OF LINE "D"; LINE "C"; LAT. "D-2" INDEX MAP.	42890		11/6/96
2	REVISED KEY MAP; DELETED LAT. "E-3"; DELETED DEBRIS BASIN & END OF LINE "E"; ADDED LAT. "E-1a".	42890		7/1/97

HYDRAULIC ELEMENTS

LINE	STATION	Q IN C.F.S.	CONDUIT SIZE	S.F.	VELOCITY IN FT./SEC.	DEPTH
LINE "B"	5+75.00 TO 5+85.00	76.0	4'x2' R.C. BOX	0.1000	36.5	0.54
	5+85.00 TO 5+90.00	76.0	48" R.C.P.	0.1000	35.2 ⊛⊛⊛	0.91'
	5+90.00 TO 7+10.00	76.0	48" R.C.P.	0.3097	37.0 ⊛⊛⊛	0.88'
	7+10.00 TO 9+65.41	76.0	48" R.C.P.	0.0300	13.6 ⊛	1.91'
	9+65.41 TO 10+18.50	79.0	48" R.C.P.	0.0300	13.7 ⊛	2.59'
	10+18.50 TO 10+38.00	66.0	48" R.C.P.	0.0300	11.1 ⊛	3.28'
	10+38.00 TO 10+43.00	66.0	T.S. NO. 1	0.0300	5.7	2.91'
	10+43.00 TO 10+48.00	66.0	45°x 5'W R.C. BOX	0.0300	6.2	2.68'
LINE "C"	9+37.00 TO 9+56.13	125.0	48" R.C.P.	0.0190	14.0	2.78'
	9+56.13 TO 10+21.00	121.0	48" R.C.P.	0.0190	14.4	3.31'
	10+21.00 TO 10+34.64	121.0	25°x 5'W R.C. BOX	0.0098	9.9	⊙
	10+34.64 TO 10+41.00	119.0	25°x 5'W R.C. BOX	0.0091	9.6	⊙
	10+42.00 TO 10+47.70	117.0	48" R.C.P.	0.0190	12.0	3.88'
	10+47.70 TO 10+57.70	114.0	48" R.C.P.	0.0190	12.6	2.82'
	10+57.70 TO 11+00.00	110.0	48" R.C.P.	0.0190	13.2	3.17'
LAT. "C-1"	1+02.01 TO 1+74.81	4.0	18" R.C.P.	0.1015	12.7	0.77'
LAT. "C-2"	1+02.57 TO 1+30.44	3.0	18" R.C.P.	0.0008	1.7	⊙
	1+30.44 TO 1+62.29	3.0	18" R.C.P.	0.0665	9.5	0.66'
LAT. "C-3"	1+03.15 TO 1+48.96	12.0	18" R.C.P.	0.1270	17.0	1.31'
	1+04.00 TO 2+05.41	20.0	24" R.C.P.	0.0396	13.4	1.61'
LAT. "C-4"	2+19.41 TO 2+33.87	16.0	24" R.C.P.	0.0173	5.1	⊙
LINE "D"	2+88.00 TO 3+01.50	1283.0	8'x 5'W R.C. BOX	0.0115	25.9	5.85'
	3+01.50 TO 9+04.51	1283.0	102" R.C.P.	0.0115	28.0 ⊛⊛	7.25'
	9+04.51 TO 9+55.41	1283.0	102" R.C.P.	0.0217	29.4 ⊛⊛	6.15'
	9+55.41 TO 10+06.21	1278.0	102" R.C.P.	0.0217	30.0 ⊛⊛	5.99'
	10+06.21 TO 15+16.50	1193.0	102" R.C.P.	0.0217	35.9 ⊛⊛⊛	5.26'
	15+16.50 TO 15+21.50	1193.0	T.S. NO. 1	0.0217	37.2	4.82'
	15+21.50 TO 15+30.00	1193.0	8'x 5'W R.C. BOX	0.0217	37.4	3.78'
	15+30.00 TO 15+40.00	1193.0	SPECIAL TRANSITION SECTION	0.0217	37.7	3.76'
	15+40.00 TO 16+05.00	1193.0	SPECIAL TRANSITION SECTION	0.3545	37.5	3.54'
	16+05.00 TO 16+37.00	1193.0	SPECIAL TRANSITION SECTION	0.0300	14.3	4.54'
LAT. "D-1"	1+04.25 TO 1+17.24	4.0	18" R.C.P.	0.0015	2.7	⊙
	1+17.24 TO 1+85.08	4.0	18" R.C.P.	0.1069	13.0	0.77'
LAT. "D-2"	1+08.00 TO 1+47.33	85.0	48" R.C.P.	0.0381	15.5	1.92'
	1+47.33 TO 1+92.00	80.0	48" R.C.P.	0.0381	14.5	2.71'
LAT. "D-2a"	1+03.32 TO 1+55.06	11.0	18" R.C.P.	0.1156	16.5	1.27'
LAT. "D-3"	1+08.00 TO 1+37.77	65.0	36" R.C.P.	0.0095	9.2	⊙
	1+37.77 TO 6+12.01	65.0	36" R.C.P.	0.0264	16.0	2.53'
	6+12.01 TO 6+72.36	58.0	36" R.C.P.	0.0264	11.8	2.47'
LAT. "D-3a"	1+03.00 TO 3+85.00	8.0	24" R.C.P.	0.0460	11.4	1.01'
	3+85.00 TO 4+41.00	4.0	24" R.C.P.	0.0460	9.2	0.70'
LAT. "D-3ab"	1+01.50 TO 1+84.54	4.0	18" R.C.P.	0.0397	9.1	1.39'
LINE "E"	4+39.00 TO 4+54.50	~~213.0~~ 209.0	7'W x 7'W R.C. BOX	0.0008 ~~47~~	~~3.8~~ 4.3	⊙
	4+54.50 TO 4+62.33	~~213.0~~ 209.0	84" R.C.P.	0.0008 ~~47~~	~~3.8~~ 5.5	⊙
	4+62.33 TO 5+03.50	~~213.0~~ 209.0	84" R.C.P.	~~0.0008~~ 0.0045	~~3.8~~ 25.7	~~1.96~~ 1.96
	5+03.50 TO 5+30.00	174.0	84" R.C.P.	0.4366	29.6 ⊛	2.08
	5+30.00 TO 9+56.50	174.0	84" R.C.P.	0.0200	19.4	2.22'
	9+56.50 TO 10+43.50	171.0	84" R.C.P.	0.0200	17.0	2.23'
	10+43.50 TO 10+60.00	168.0	84" R.C.P.	0.0200	16.6	2.18'
	10+60.00 TO 10+75.00	138.0	T.S. NO. 3	0.2200	14.2	2.90'
	10+75.00 TO 11+15.00	138.0	48" R.C.P.	0.0190	14.1	3.49'
LAT. "E-1"	1+03.50 TO 1+79.10	3.0	18" R.C.P.	0.1792	14.4	0.66'
LAT. "E-2"	1+03.50 TO 1+78.00	3.0	18" R.C.P.	0.1584	13.8	0.66'
LAT. "E-2a"	1+12.60 TO 1+54.00	33.0	36" R.C.P.	0.0208	10.7	1.87'
LINE "F"	7+90.00 TO 8+16.00	14.7	36" R.C.P.	0.1000	15.8 ⊛	0.71'
	8+16.00 TO 9+50.00	14.7	36" R.C.P.	0.3265	22.2 ⊛	0.66'
	9+50.00 TO 10+45.00	14.7	36" R.C.P.	0.0300	14.1 ⊛	1.22'
LINE "G"	9+62.00 TO 10+11.00	355.4	60" R.C.P.	0.0160	24.9 ⊛	3.49'
	10+11.00 TO 10+70.00	206.0	60" R.C.P.	0.0160	38.2 ⊛⊛	1.76'
	10+70.00 TO 11+89.00	206.0	60" R.C.P.	0.2400	39.9 ⊛⊛	2.68'
	11+89.00 TO 11+94.00	206.0	T.S. NO. 1	0.2400	17.2	2.40'
	11+94.00 TO 12+00.00	206.0	6'W x 5'W R.C. BOX	0.2400	16.9	3.75'
LINE "H"	9+63.00 TO 10+54.52	157.4	54" R.C.P.	0.0156	16.1	2.70'
	10+54.52 TO 14+38.64	154.4	54" R.C.P.	0.0156	16.3	2.59'
	14+38.64 TO 16+15.34	143.6	48" R.C.P.	0.0186	16.3	3.04'
	16+15.34 TO 17+71.59	135.3	48" R.C.P.	0.0186	15.8	3.47'
	17+71.59 TO 20+83.62	109.3	48" R.C.P.	0.0186	15.8	2.55
	20+83.62 TO 22+87.68	101.0	48" R.C.P.	0.0186	15.1	3.05'
	22+87.68 TO 23+02.04	74.0	48" R.C.P.	0.0025	5.9	⊙
	23+02.04 TO 25+00.00	73.0	48" R.C.P.	0.0210	19.6	1.56'
	25+00.00 TO 27+17.32	73.0	48" R.C.P.	0.0506	20.5 ⊛	1.47
	27+17.92 TO 30+84.00	50.0	36" R.C.P.	0.0506	20.6 ⊛	1.68
	30+40.00 TO 30+84.93	50.0	36" R.C.P.	0.0250	12.3	2.10
	30+84.93 TO 31+08.87	36.0	36" R.C.P.	0.0250	5.4	3.72
	31+08.87 TO 31+39.38	31.0	36" R.C.P.	0.0195	5.9	3.02
LAT. "H-7"	1+04.00 TO 1+29.09	5.0	18" R.C.P.	0.0023	2.8	⊙
	1+29.09 TO 1+58.49	5.0	18" R.C.P.	0.0657	10.4	0.86'
LAT. "H-8"	1+03.50 TO 1+62.89	25.0	36" R.C.P.	0.0212	10.4	1.61'
LAT. "H-9"	1+17.80 TO 1+20.36	15.0	36" R.C.P.	0.0050	2.1	⊙
	1+20.36 TO 1+30.78	15.0	36" R.C.P.	0.0863	12.9	2.72
	1+30.78 TO 1+60.00	12.0	36" R.C.P.	0.0863	13.7	2.12
	1+60.00 TO 3+97.67	12.0	36" R.C.P.	0.0282	10.4	0.86
	3+97.67 TO 6+80.00	12.0	36" R.C.P.	0.0100	7.2	1.10
LAT. "H-9a"	1+02.00 TO 1+49.07	4.0	18" R.C.P.	0.0779	11.0	0.77
LAT. "H-10"	1+03.00 TO 1+04.42	5.0	18" R.C.P.	0.0023	2.8	⊙
	1+04.42 TO 1+23.91	5.0	18" R.C.P.	0.2038	14.9	0.86'

HYDRAULIC ELEMENTS CONTINUED ON SHEET NO. 16

⊛ THE MINIMUM CONCRETE COVER OVER THE STEEL IN THE INVERT = 1.25 INCHES.
⊛⊛ THE MINIMUM CONCRETE COVER OVER THE STEEL IN THE INVERT = 1.75 INCHES.
⊛⊛⊛ THE MINIMUM CONCRETE COVER OVER THE STEEL IN THE INVERT = 2.25 INCHES.



BENCH MARK: CL 3976
LACRD B.M.
RDBM TAG IN C.B. 4 FT. N. B.C.R. 70 FT. N. AND 32 FT. E. C.L. INT. OLD ROAD AND HASLEY CYN. ROAD OFF-RAMP
NEWHALL QUAD (1983) ELEV. 1065.685

GENERAL NOTES (Cont'd)

22. ALL BACKFILL AND FILLS WITHIN STREET RIGHT OF WAY SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 306-1.3.4 OF THE STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED AND INSPECTED BY THE DEPARTMENT CONTRACTOR SHALL NOTIFY THE INSPECTOR AT LEAST 24 HOURS IN ADVANCE FOR SOIL TESTING AS REQUIRED BY THE INSPECTOR.

23. PIPE BEDDING SHALL BE IN ACCORDANCE WITH LOS ANGELES COUNTY ENGINEER CASE AD BEDDING PER STANDARD DRAWING D-54 UNLESS OTHERWISE NOTED. THE BEDDING MATERIAL PLACED FROM THE BOTTOM OF THE PIPE TO 1 FOOT OVER THE TOP OF THE PIPE SHALL BE SAND, CRUSHED AGGREGATE, OR NATIVE FREE-DRAINING GRANULAR MATERIAL AND SHALL HAVE A SAND EQUIVALENT OF 20 OR GREATER.

24. *"UNLESS OTHERWISE SPECIFIED IN THE PROFILE ON THESE PLANS, THE PIPE SHALL BE MANUFACTURED WITH A MINIMUM CONCRETE COVER OVER THE STEEL IN THE INVERT OF 0.75 INCHES FOR R.C.P. UP TO 96-INCHES IN DIAMETER AND 1.25 INCHES FOR PIPE GREATER THAN 96 INCHES IN DIAMETER".*

25. PIPE SHALL BE EMBEDDED 5 INCHES INTO ALL STRUCTURES INCLUDING INLET AND OUTLET HEADWALLS UNLESS OTHERWISE SPECIFIED.

26. ALL CATCH BASINS WITHIN THE DEDICATED STREET RIGHT-OF-WAY SHALL BE CONSTRUCTED WITH THE STREET PLANS.

27. *THE CONTRACTOR SHALL PROVIDE TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS A SYSTEM FOR CONTRIBUTORY DRAINAGE TO BE OPERABLE AT ALL TIMES UNTIL THIS STORM DRAIN SYSTEM IS ACCEPTED FOR MAINTENANCE. THIS MAY HAVE TO BE DESIGNED BY A CIVIL ENGINEER.*

28. ALL REFERENCES ON THIS PLAN TO THE COUNTY ENGINEER, ROAD DEPARTMENT, OR FLOOD CONTROL DISTRICT SHALL APPLY TO THE APPROPRIATE ELEMENTS OF THE DEPARTMENT OF PUBLIC WORKS.

29. EXISTING UTILITIES SHALL BE MAINTAINED IN PLACE BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.

30. WHERE THE UTILITIES ARE INDICATED ON THE DRAWINGS TO BE SUPPORTED, SAID SUPPORTS SHALL BE IN ACCORDANCE WITH STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION NO. 224-0, UNLESS OTHERWISE INDICATED.

31. ALL OPENINGS RESULTING FROM THE CUTTING OR PARTIAL REMOVAL OF EXISTING CULVERTS, PIPES OR SIMILAR STRUCTURES SHALL BE SEALED WITH 8 INCHES OF BRICK AND MORTAR AND 6 INCHES OF CONCRETE, UNLESS OTHERWISE SHOWN.

32. MANHOLES NO. 1, 2, 3, AND 4 SHALL USE THE STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION **NO. 630** FOR THE "FRAME AND COVER" AND **NO. 635** OR THE "STANDARD DROP STEP".

33. THIS STORM DRAIN WILL NOT BE ACCEPTED FOR MAINTENANCE UNTIL THE STREETS HAVE BEEN PAVED, MANHOLES BROUGHT TO GRADE, AND THE SYSTEM CLEANED TO SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.

34. *THE LATEST REVISED STANDARD PLAN OR DRAWING SHALL BE USED UNLESS OTHERWISE SPECIFICALLY NOTED.*

35. *A NPDES PERMIT FROM THE REGIONAL WATER QUALITY CONTROL BOARD IS REQUIRED BEFORE ANY DISHARGE OF NON-STORM WATER INTO THE STORM DRAIN IS ALLOWED.*

LIST OF STANDARDS

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT — A.P.W.A.

1.	M.H. NO. 1	PER	2-D102	PER (321-0)
2.	M.H. NO. 2	"	2-D164	" (320-0)
3.	M.H. NO. 4	"	2-D113	" (322-0)
4.	J.S. NO. 2	"	2-D112	" (331-0)
5.	J.S. NO. 4	"	2-D193	" (332-0)
6.	T.S. NO. 1	"	2-D235	" 342-0)
7.	T.S. NO. 3	"	2-D188	" (340-0)
8.	M.H. SHAFT	"	2-D107	" (324-0)
9.	J.S. NO. 1	"	2-D189	" (333-0)
10.	REINFORCING BARS A.S.T.M. 615	"	2-D171	" (380-0)
11.	CONCRETE COLLAR	"	2-0393	" L.A.C.D.P.W. (3089-0)
12.	TRASH RACK	"	2-DTR 1.1 TO 1.2	" (3089-0)

AMERICAN PUBLIC WORKS ASSOCIATION

1.	CURB OPENING CATCH BASIN	PER	300-0
2.	CATCH BASIN FRAME & COVER	"	312-1
3.	CATCH BASIN REINFORCEMENT	"	309-0
4.	MONOLITHIC CATCH BASIN CONNECTION	"	308-0
5.	CATCH BASIN FACE PLATE ASSEMBLY AND PROTECTION BAR	"	310-0
6.	FRAME & GRATING FOR CATCH BASIN	"	311-0
7.	LOCAL DEPRESSION AT CATCH BASIN	"	313-0 (CASE "E")
8.	CHAIN LINK FENCE & GATE	"	600-0
9.	HEADWALL FENCE	"	600-0
10.	MANHOLE FRAME & COVER	"	630-1
11.	STANDARD DROP STEP	"	635-0
12.	COMMERCIAL DRIVEWAY	"	101-0 (110-0)
13.	CONCRETE RETAINING WALL	"	615-0
14.	CONCRETE STAIRWAY	"	640-0
15.	HAND RAIL	"	606-0
16.	REINFORCED CONCRETE RETAINING WALL, TYPE 4	"	613-0

LOS ANGELES COUNTY ENGINEER

1.	PIPE BEDDING	PER	D-54 (3092-0)
2.	SAFETY REQUIREMENTS	"	S-2 (6008-0)

LOS ANGELES COUNTY DEPT. OF PUBLIC WORKS

1.	SLOPED PROTECTION BARRIER	PER	3060-0
2.	ENERGY DISSIPATOR (IMPACT TYPE)	"	3097-0

REGISTERED PROFESSIONAL ENGINEER RONALD R. HORN No. 16913 Exp 6/30/99 CIVIL STATE OF CALIFORNIA

PLANS PREPARED BY:
SIKAND ENGINEERING ASSOCIATES
15230 BURBANK BLVD. VAN NUYS, CALIF. 91411, TEL. (818) 787-8550
RONALD R. HORN
SIGNATURE: Ronald R Horn, R.C.E. NO. 16913

PRIVATE DRAIN (PD'S) GENERAL NOTES:

THE FOLLOWING GENERAL NOTES ARE TO BE INCLUDED ON THE TITLE SHEET OF ALL P.D. PLANS.

1. A PERMIT SHALL BE OBTAINED AND A DEPOSIT PAID TO THE DEPARTMENT OF PUBLIC WORKS AT THE PERMIT COUNTER 900 SOUTH FREMONT AVENUE 8TH FLOOR, ALHAMBRA AT LEAST 72 HOURS PRIOR TO STARTING WORK UNDER THIS CONTRACT. COPIES OF ALL OTHER REQUIRED PERMITS, SUCH AS FLOOD CONTROL DISTRICT AND ROAD EXCAVATION, MUST BE FILED WITH THE PERMIT APPLICATION.
2. WHEN WORK IS WITHIN A CONTRACT CITY, THE CONTRACTOR MUST CONTACT THE DIRECTOR OF PUBLIC WORKS OF THAT CITY TO DETERMINE THE LOCATION TO PAY THE INSPECTION DEPOSIT.
3. THE CONTRACTOR SHALL CONTACT THE DISTRICT OFFICE LISTED ON THE "APPLICATION FOR STORM DRAIN CONSTRUCTION INSPECTION FORM I" TO ARRANGE FOR AN ACCEPTABLE CONSTRUCTION START DATE.
4. APPROVAL OF THIS PLAN BY THE COUNTY OF LOS ANGELES DOES NOT CONSTITUTE A REPRESENTATION TO THE ACCURACY OF THE LOCATION OR THE EXISTENCE OR NONEXISTENCE OF ANY UNDERGROUND UTILITY, PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THIS NOTE APPLIES TO ALL SHEETS.
5. ALL WORK SHALL BE IN ACCORDANCE WITH THE *LATEST ADOPTED EDITION OF THE "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION", INCLUDING SUPPLEMENTS AND SHALL BE PROSECUTED ONLY IN THE PRESENCE OF THE DIRECTOR OF PUBLIC WORKS.*
6. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 7-10.4 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION IN REGARD TO SAFETY ORDERS AND SHALL CONFORM TO THE "MINIMUM PUBLIC SAFETY REQUIREMENTS" AS SHOWN ON LOS ANGELES COUNTY ENGINEER STANDARD S-2 *(SEE PAGES 36-49 FOR A COPY).*
7. ELEVATIONS ARE IN FEET ABOVE U.S.C. & G.S. MEAN SEA LEVEL DATUM OF 1929, UNLESS OTHERWISE NOTED.
8. NO CONCRETE SHALL BE PLACED UNTIL THE FORMS AND REINFORCING STEEL HAVE BEEN PLACED, INSPECTED AND APPROVED.
9. ALL STRUCTURAL CONCRETE SHALL BE PORTLAND CEMENT CONCRETE WITH AN ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF 3250 P.S.I. *(4000 P.S.I. REQUIRED FOR R.C. BOXES, INLETS & OUTLETS).*
10. TRANSVERSE REINFORCEMENT AND TRANSVERSE JOINTS SHALL BE PLACED AT RIGHT ANGLES (OR RADIAL) TO THE CONDUIT CENTER LINE EXCEPT AS OTHERWISE SHOWN ON THE DRAWINGS.
11. ALL STEEL ADJACENT TO FACE OF CONCRETE SHALL HAVE 2" "CLEARANCE UNLESS OTHERWISE SPECIFIED.
12. REINFORCEMENT SHALL BE DEFORMED BARS OF INTERMEDIATE GRADE STEEL, PER A.S.T.M. A-615-GRADE 60.
13. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE "MANUAL OF STANDARD PRACTICE."
14. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTER LINE OF STEEL UNLESS OTHERWISE NOTED.
15. ALL STEEL THAT IS TO BE CONTINUOUS SHALL HAVE A MINIMUM LAP OF 30 BAR DIAMETERS OR 18" WHICHEVER IS GREATER.
16. ALL CONSTRUCTION JOINTS IN THE FOOTING OF SLABS AND WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
17. ALL EXPOSED EDGES SHALL BE FINISHED WITH A ¾" CHAMFER.
18. UNLESS OTHERWISE SHOWN, CONCRETE DIMENSIONS SHAL BE MEASURED VERTICALLY OR HORZONTALLY AND PARALLEL OR AT RIGHT ANGLES (OR RADIAL) TO THE CENTER LINE OF CONSTRUCTION.
19. **CONCRETE BACKFILL IS REQUIRED**
WHEN THE PIPE HAS LESS THAN ONE FOOT OF COVER, THE CONCRETE BACKFILL SHALL CONSIST OF 1:3:5 MIX PORTLAND CEMENT CONCRETE POURED FROM WALL TO WALL OF TRENCH AND FROM BOTTOM OF TRENCH TO A MINIMUM OF 4 INCHES OVER THE TOP OF THE PIPE.
20. ALL PIPES SHALL BE PLACED IN TRENCH IN NATURAL GROUND AND/OR COMPACTED FILL. THE GROUND LEVEL BEFORE THE TRENCHING SHALL BE AT LEAST 3 FEET ABOVE THE TOP OF THE PIPE ELEVATION, OR AT FINISH SURFACE ELEVATION, WHICHEVER IS LESS.
21. ALL BACKFILL AND FILLS OUTSIDE OF STREET RIGHT OF WAY SHALL BE COMPACTED TO 90% OF MAXIMUM DENSITY AS DETERMINED BY ASTM SOIL COMPACTION TEST D 1557-78 METHOD "D" UNLESS OTHERWISE SPECIFIED. THIS SHALL BE CERTIFIED BY A GEOTECHNICAL ENGINEER. THIS CERTIFICATION SHALL BE SUBMITTED TO THE DIRECTOR OF PUBLIC WORKS PRIOR TO ACCEPTANCE OF THE WORK BY THE COUNTY.

RIPRAP NOTES

1. ROCKS FOR GROUTED RIPRAP SHALL BE GOOD QUALITY RIVER RUN ROCK. THE SMALLEST DIMENSIONS SHALL EXCEED 3 INCHES AND THE LARGEST DIMENSION SHALL NOT EXCEED 18 INCHES. THE LARGEST DIMENSION SHALL NOT EXCEED 4 TIMES THE SMALLEST DIMENSION.
2. THERE SHALL BE A GROUT BED OF AT LEAST 2 INCHES BENEATH THE FIRST LAYER OF ROCK. ALL THE VOIDS BETWEEN THE ROCKS SHALL BE FILLED WITH GROUT. MAXIMUM SPACING BETWEEN ROCKS SHALL BE 2 INCHES.
3. SURFACE ROCKS SHALL BE IMBEDDED FROM 1/2 TO 2/3 OF THEIR MAXIMUM DIMENSION.

NOTE: CONCRETE MAY BE SUBSTITUTED FOR THE GROUT.

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THIS MAP.

THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES SHOWN AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THIS DRAWING.

Ronald R. Horn 16913 — REGISTERED CIVIL ENGINEER No
6-24-99 — DATE

PF520355

REVISION

935-1-99-1-20

COUNTY OF LOS ANGELES, CALIFORNIA
HARRY W. STONE — DIRECTOR OF PUBLIC WORKS

LAND DEVELOPMENT DIVISION

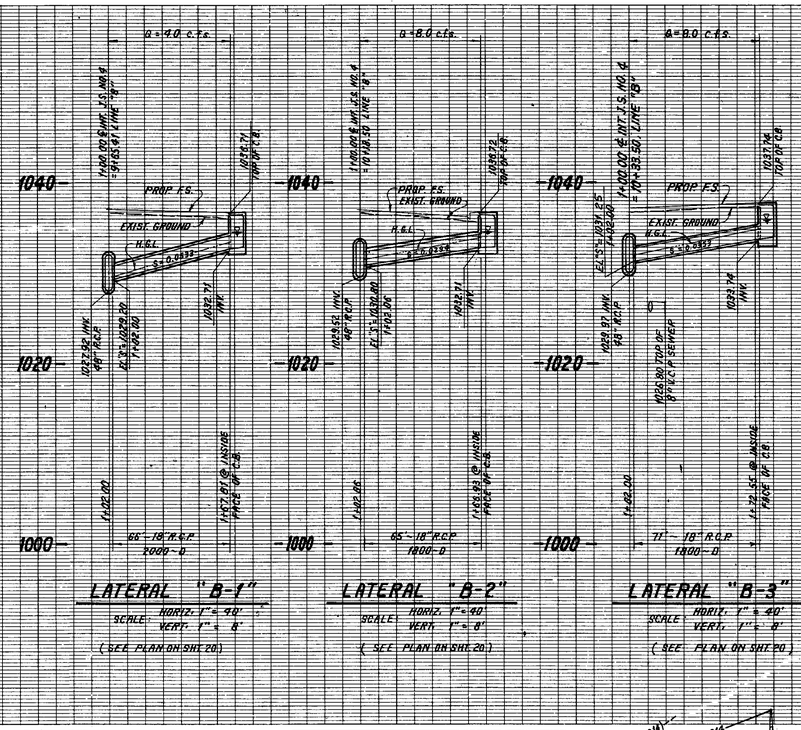
APPROVED BY: Thomas Kevin Hund — ASSISTANT DEPUTY DIRECTOR — DATE: 10/5/99

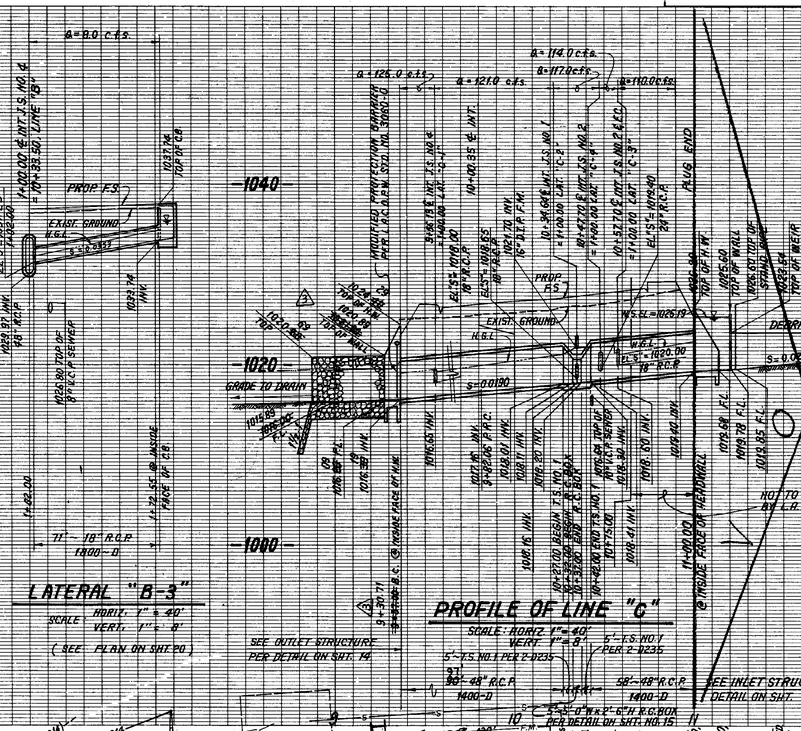
CHECKED BY: Ronald R. Horn — R.C.E. NO. 16913 — DATE: 6-24-99 — OFFICE OF THE DIRECTOR OF PUBLIC WORKS

SHT. 1 OF 20 SHTS

W.O. 1020-252-01

STORM DRAIN PLANS IN
P.M. No. 22261 P.D. No. 2298 (UNIT II)





NO.	REVISION	REVISED BY	APPROVED BY	DATE
1	REVISED EASEMENT DATA.	42890	B. Hamamoto	7/22/94
2	ADDED 12" PIC CONNECTION TO SIDE OF C.B. LOCATED @ STA 11+58.00 WIDENED DEBRIS BASIN @ EAST SIDE & REVISED "B" & "D" OF LINE "C".	42890	B. Hamamoto	12/16/94
3	REVISED LINE "C", LAT. "C-1", "C-3", "C-4" & LAT. "C-4a".	42890	B. Hamamoto	7/1/99

(3)	14°04'10"	45.00'	11.05'	5.55'
(4)	01°03'04"	2526.00'	46.34'	23.17'
(5)	29°37'43"	22.50'	11.64'	5.95'
(6)	45°43'47"	22.50'	17.96'	9.49'
3 (7)	51°29'55"	22.50'	20.22'	10.85'

℄ STORM DRAIN CURVE DATA

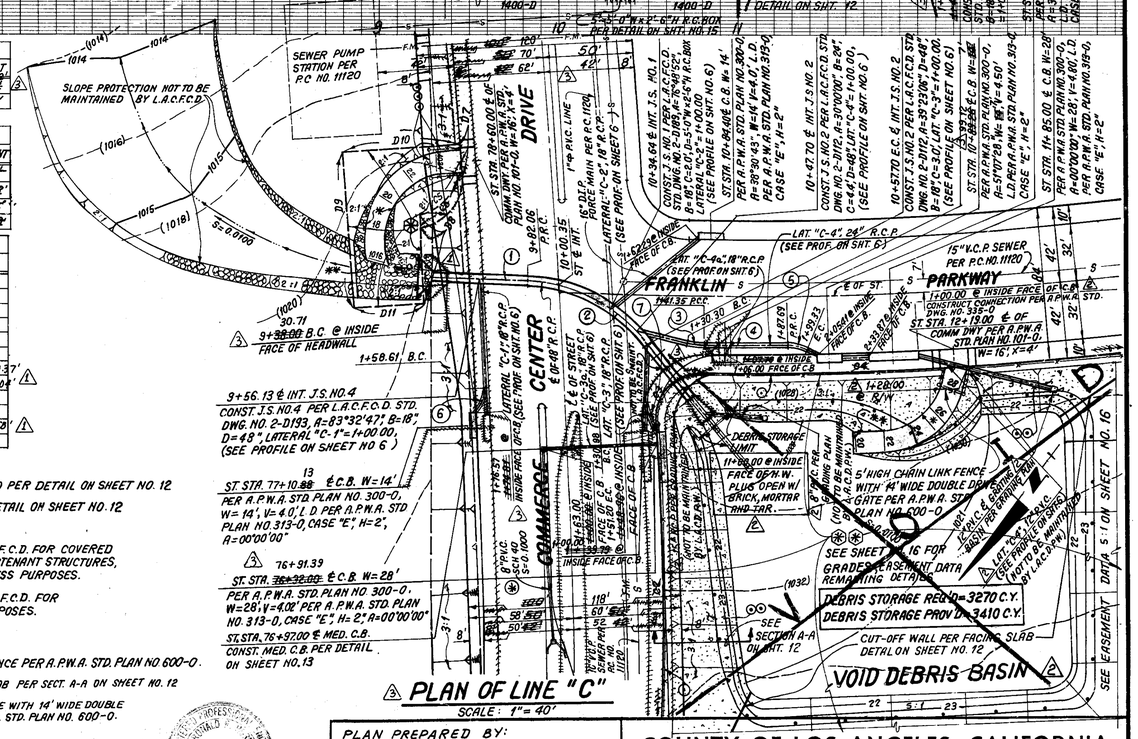
NO.	DELTA	RADIUS	LENGTH	TANGENT
~~(1)~~	~~01°02'02"~~	~~2494.00'~~	~~45.06'~~	~~22.53'~~
(2)	48°09'10"	90.00'	75.64'	40.21'

EASEMENT CURVE DATA

NO.	DELTA	RADIUS	LENGTH	TANGENT
~~C1~~	~~00°25'46"~~	~~4958.00'~~	~~37.00'~~	~~18.50'~~
~~C2~~	~~02°53'22"~~	~~5050.00'~~	~~240.01'~~	~~120.02'~~
~~C3~~	~~52°41'50"~~	~~27.00'~~	~~15.88'~~	~~8.80'~~
~~C4~~	~~05°36'06"~~	~~2562.00'~~	~~250.00'~~	~~125.10'~~
1 C5	~~90°25'25"~~ 95°21'00"	27.00'	~~42.64'~~ 44.96'	~~27.90'~~ 29.70'

EASEMENT DATA

NO.	BEARING	DISTANCE
	N36°07'45" W	
D7	N41°34'46"W	~~16.39'~~ 9.37'
D8	~~N41°34'46"W~~	~~42.64'~~ 50.0'
D9	N41°34'46"W	86.00'
D10	N 48°25'14"E	66.00'
D11	N 48°25'14"E	~~38.49'~~ 9.68'



* 12' WIDE ACCESS ROAD PER DETAIL ON SHEET NO. 12

** CUT-OFF WALL PER DETAIL ON SHEET NO. 12

Ⓐ EASEMENT TO L.A.C.F.C.D. FOR COVERED STORM DRAIN, APPURTENANT STRUCTURES, AND INGRESS & EGRESS PURPOSES.

ⒷⒷ EASEMENT TO L.A.C.F.C.D. FOR FLOOD CONTROL PURPOSES.

⊙ 5' HIGH CHAIN LINK FENCE PER A.P.W.A. STD. PLAN NO 600-0.

⊙⊙ CONCRETE FACING SLAB PER SECT. A-A ON SHEET NO. 12

⊙⊙⊙ 5' HIGH CHAIN LINK FENCE WITH 14' WIDE DOUBLE DRIVE GATE PER A.P.W.A. STD. PLAN NO. 600-0.

3 Ⓐ Ⓑ - NOT TO BE MAINTAINED BY L.A.C.F.C.D.

REGISTERED PROFESSIONAL ENGINEER — No. 42830 — Exp. 03-31-00 — CIVIL — STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER — No. 16913 — CIVIL — STATE OF CALIFORNIA

PLAN PREPARED BY:
SIKAND ENGINEERING ASSOCIATES
15230 BURBANK BLVD.
VAN NUYS, CA. 91411
(818) 787-8550
SIGNATURE: Ronald R. Sikand R.C.E. NO. 16913

COUNTY OF LOS ANGELES, CALIFORNIA
HARRY W. STONE DIRECTOR OF PUBLIC WORKS
LAND DEVELOPMENT DIVISION
CHECKED BY: [illegible] R.C.E. NO. [illegible] DATE: 12-8-99
OFFICE OF THE DIRECTOR OF PUBLIC WORKS

SHT 2 OF 20 SHTS

1020-252-01

STORM DRAIN PLANS IN
P.M. NO. 22261 P.D. NO. 2298 (UNIT II)

CONCRETE DITCH-FACING SLAB JOINT DETAIL

NOT TO SCALE

CONC. DITCH PER DETAIL HEREON

CONC. DITCH ABUTTING FACING SLAB (COLD JOINT)

CONC. FACING SLAB PER DETAIL ON SHEET NO. 12

TOP OF DITCH

BOTTOM OF DITCH

CONC. DITCH ABUTTING FACING SLAB (COLD JOINT)

CONC. FACING SLAB

SECTION X-X

NOT TO SCALE

STORM DRAIN EASEMENT CURVE DATA				
NO.	DELTA	RADIUS	LENGTH	TANGENT
C1	00°19'32"	3050.00'	17.34'	8.67'
C2	90°00'00"	25.00'	39.27'	25.00'
C3	90°00'00"	25.00'	39.27'	25.00'
C4	11°36'56"	3050'	618'	309'
C5	08°12'21"	5050.00'	72.31'	36.22'
C6	00°20'28"	5050.00'	30.00'	15.00'
C7	60°57'25"	15.00'	15.96'	8.77'

PROFILE OF LINE "D"

SCALE: HORIZ. 1"=40'
VERT. 1"=8'

S.D. PER EXTENDED P.D. NO. 2381

Q=1283.0 C.F.S

Q=1278.0 C.F.S

Q=1193.0 C.F.S

Q=4.0 C.F.S

3+55.41 ℄ INT. J.S. NO.1 = 1+00.00 LATERAL "D-1"

10+82.87 ℄ INT. J.S. NO.2 = 1+00.00, LATERAL "D-2"

10+400.00 ℄ INT. MH. NO. 4

10+416.18 ℄ INT. MH. NO. 4 = 1+00.00, LATERAL "D-2"

10+82.87 ℄ INT. J.S. NO.3 = 1+00.00, FUT. LATERAL

11+37.31 ℄ INT. J.S. NO.4 = 1+00.00, FUT. LATERAL

14+00.00 ℄ INT. J.S. NO.4 = 9+55.41, LINE "D"

14+92.80 ℄ INT. MH. NO.4 = 1+52.80, LAT. "D-4"

15+30.00 ℄ INT. J.S. NO.5

20' V.C. P.I. = 1044.00

10' V.C. P.I. 1067.04

4" THICK CHAIN LINK FENCE PER PARK & REC. DEPT. STD. PLAN NO. 5004 MTD. ON TOP OF SPILLWAY

6' WIDE PERFORATED SUBDRAINS PER DETAIL ON SHT. NO. 17

PROTECTION BARRIER PER L.A. COUNTY STD. NO. 3060-D

105 C.F. TOP OF SPILLWAY

EXIST. GROUND

PROP. F.S.

H.G.L.

EL. "S" = 1034.55 18" R.C.P.

EL. "S" = 1034.40 48" R.C.P.

EL. "S" = 1038.20 24" R.C.P.

EL. "S" = 1038.60 24" R.C.P.

EL. "S" = 1046.90 36" R.C.P.

EL. 1059.60

EL. 1054.60

W.S. = 1074.29

S=0.021f

S=0.0217

S=0.0445

S=0.0039

S=0.2308

S=0.0217

3+94.51 P.R.C. MATCH LINE SEE SHEET NO. 1

1030.18 INV.

1031.29 INV.

1031.79 INV.

1031.87 INV.

1032.32 INV.

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1054.95 INV.

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Valencia Commerce Center VTPM 18108 -Evaluation of Conformance with LID and Hydromodification Performance Standards

Volume II

County of Los Angeles

Prepared for:

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Valencia, CA 91355

Prepared by:

GEOSYNTEC CONSULTANTS

DATED:
November, 2024

Valencia Commerce Center Vesting Tentative Parcel Map No. 18108

Evaluation of Conformance with Project LID and Hydromodification Performance Standards

Geosyntec Consultants, November 2024

Limitations

The professional engineering seal affixed to this memorandum pertains specifically to the analysis presented in this memorandum. It does not pertain to the design of the storm drain system or the design of regional LID facilities. The analysis presented in this memorandum relies upon information provided by a third party. We have not independently confirmed the accuracy of this information.

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Memorandum

Date:	November 2024
To:	Alex Herrell, Five Point
	Jason Fukumitsu, Hunsaker and Associates
From:	Leon Li, Austin Orr, Lindsey Spencer and Aaron Poresky, Geosyntec Consultants
Subject:	Valencia Commerce Center Vesting Tentative Parcel Map 18108 – Evaluation of Conformance with LID and Hydromodification Performance Standards

1. INTRODUCTION

The Valencia Commerce Center Vesting Tentative Parcel Map (VTPM) 18108 (Project) includes low impact development (LID) best management practices (BMPs) as shown in the *Proposed Condition Low Impact Development Exhibit* (LID Exhibit, included as Attachment A to this Memorandum) for the Project. The project boundary and land uses are illustrated in Figure 1.

The purpose of this memorandum is to verify that the BMPs proposed for the Project have been selected and sized in a manner consistent with the Project LID Performance Standard as defined by the Municipal Separate Storm Sewer System Discharges within the Coastal Watersheds of Los Angeles and Ventura Counties (MS4) Permit (Order No. R4-2021-0105) and the County of Los Angeles LID Standards Manual (LACDPW, 2014). The *Newhall Ranch Sub-Regional Stormwater Mitigation Plan (NRSSMP)* (Geosyntec, 2010) also serves as benchmarks for evaluating conformance. This memorandum also demonstrates that the entire Project is exempt from hydromodification standards.

The Project LID Performance Standard establishes three separate conformance metrics, including BMP selection, sizing of BMPs to provide adequate retention volume or equivalent biofiltration volume and sizing of BMPs to provide long-term storm water capture:

- **BMP selection.** LID BMPs have been selected in a manner consistent with the LID selection criteria (i.e., infiltration feasibility criteria) contained in the LID Performance Standard; and

- **LID design storm retention and biofiltration.** The proposed BMPs provide retention or equivalent biofiltration of the LID design storm consistent with the LID Performance Standard; and

- **BMP long-term capture.** The proposed BMPs provide capture and treatment of at least 80 percent of average annual runoff volume for each drainage area within the Project, consistent with the LID Performance Standard.

This memorandum demonstrates conformance with the first two conformance metrics (BMP selection and LID design storm retention and biofiltration). The Project's conformance to the 80 percent long-term capture metric is not documented in this memorandum as it is not a requirement of the MS4 Permit, or the LID Standards Manual and is not subject to review by LACDPW.

Because the proposed Project disturbs greater than one acre of area and adds more than 10,000 square feet of impervious surface area, this Project is categorized as a Designated Project according to LACDPW's LID Standards Manual (LACDPW, 2014). This memorandum also explains why the stormwater management requirements for designated projects are met or exceeded when the Project's LID Performance Standard is met.

The Project is exempt from hydromodification (HM) requirements because stormwater from the Project discharges to engineered channel sections of Hasley Creek and Castaic Creek, which then discharge to watershed that have 100-year flows greater than 25,000 cfs (Castaic Creek, downstream of Hasley Creek and the Santa Clara River).

Section 2 describes the Project LID Performance Standard. Section 3 describes the overall approach for compliance with the Project LID Performance Standard, including the specific BMPs proposed as part of the Project and the conformance of the proposed BMPs to each of the conformance metrics identified above. Section 4 demonstrates that the Project's exemption from the HM requirements.

A list of figures and attachments are appended to the end of this memorandum, including:

Figure 1: Valencia Commerce Center Land Use
Figure 2: Valencia Commerce Center Drainage Areas and Treatment Categories
Attachment A: Valencia Commerce Center Low Impact Development Exhibit
Attachment B: Modeling Files

2. PROJECT LID PERFORMANCE STANDARD

The Project LID Performance Standard described in this section complies with the provisions of the 2021 MS4 Permit and the LID Standards Manual. As benchmarks, the LID Performance

Standard and HM exemption is also consistent with the NRSSMP. The LID Performance Standard applies to each planning area.

The Project LID Performance Standard is based primarily on Section F.1.d and F.4 of the 2021 MS4 Permit. The Newhall NRSSMP influence the manner in which BMP strategies are applied and result in more stringent criteria in some respects. These additional benchmarks do not reduce the requirement to comply with Section F.1.d and F.4 of the 2021 MS4 Permit. The LID Performance Standard would be implemented as follows:

- Based on an assessment of feasibility[1], one of four BMP strategies shall be applied as follows. BMPs may be applied at the scale of individual parcels or at the scale of regional facilities treating multiple parcels.

    a. If it is feasible to infiltrate all of the runoff produced from the 1.1 inch storm event[2] (LID Design Volume) from the developed area (i.e., soil infiltration rates are at least 0.3 inches per hour, and no other technical infeasibility concerns exist), on-site infiltration BMPs [Category 1] shall be used. Harvest and reuse are not applicable to projects in the NRSSMP because non-potable water demands will be met with recycled water and there is no additional demand for harvested stormwater based on an assessment of harvest and reuse feasibility conducted as part of the overall NRSSMP (Geosyntec, 2010).

    b. If it has been demonstrated in the Project WQTR and Drainage Concept Report that the BMP strategy of subsection (a), of this condition is infeasible, and if the project has low soil infiltration rates (i.e., the soil infiltration rate is less than 0.3 inches per hour), but no other technical infeasibility concerns exist, bioinfiltration BMPs [Category 2] shall be used. Bioinfiltration facilities are similar to bioretention facilities with an underdrain, but they include storage below the underdrain to maximize the volume infiltrated. These facilities shall retain a portion of the runoff from the 1.1 inch design storm, then biofilter 1.5 times the remaining runoff from the 1.1 inch design storm.

    c. If it has been demonstrated in the Project WQTR and Drainage Concept Report that the BMP strategies of subsections (a) and (b) above are infeasible, then biofiltration BMPs [Category 3] shall be used. These BMPs shall biofilter the runoff produced from the 1.5 times the 1.1 inch design storm.

[1] Feasibility shall be assessed per Section F.4.b.ii.
[2] The 85th percentile, 24-hour storm depth is equal to 1.1 inches as determined from the Los Angeles County 85th Percentile 24-hr Rainfall Isohyetal Map (February 2004).

d. If it has been demonstrated in the Project WQTR and Drainage Concept Report that the BMP strategies of subsections (a), (b) and (c) above are infeasible and this demonstration is accepted by the Los Angeles Regional Water Quality Control Board Executive Officer, then flow-based treatment control BMPs shall be used to filter or treat runoff. These BMPs must be sized and designed to: (1) filter or treat the maximum flow rate of runoff produced from a rainfall intensity of 0.3 inch of rainfall for each hour of a storm event and (2) be certified for "Enhanced Treatment" under the Washington State Department of Ecology's TAPE Program or an appropriate future BMP certification developed by the State of California.

- The BMPs shall also be demonstrated to provide treatment for at least 80 percent capture and treatment of the average annual runoff volume for the tributary area. This sizing criteria was established to be consistent with Newhall NRSSMP but not required by the MS4 Permit or the LID Standards Manual. Therefore, conformance to this requirement is excluded from this memorandum.

- Pretreatment must be provided for stormwater BMPs whose function may be adversely affected by sediment or other pollutants, as specified in Section 7.2 of the LID Manual (LACDPW, 2014).

The same standards shall apply to parcel-based and right-of-way LIDs. Demonstration of conformance to these standards shall be based on the overall system of BMPs proposed for the Project. This may include combinations of BMPs at multiple scales, collectively demonstrating conformance to this standard.

3. PROPOSED LID BMPS AND CONFORMANCE DEMONSTRATION

The sections below describe the LID BMPs that are proposed as part of the Project and demonstrate that these BMPs conform to the BMP selection and LID design storm retention and biofiltration requirement in the Project LID Performance Standard. Parcel-based and right-of-way LIDs are proposed for the Project, as also illustrated in Attachment A (LID Exhibit) of this memorandum. Parcel-based LIDs on commercial lots will be maintained by property owner associations (POAs). Parcel-based LIDs on access roads and Right-of-way LIDs will be maintained by LACDPW with funding provided through a Community Facilities District (CFD).

3.1 Infiltration Feasibility Screening

Based on testing by Leighton (2016) and infiltration feasibility assessment by Engeo [3](2021) and approved by LACDPW Geotechnical and Materials Division in March 2023, the site is underlain by alluvial soils with moderate permeability. However, after corrective grading, most of the Project will lie over 5 to 30 feet of certified engineered fill. Based on the very low expected infiltration rates of engineered fill, Category 2 (bioinfiltration) or Category 3 (biofiltration) parcel-based water quality treatment facilities are recommended (Engeo, 2021).

For areas identified as treated by parcel-based BMPs (Figure 2), LID BMPs shall be selected per the feasibility hierarchy described in Section 2.1 as part of final parcel improvement plans to the satisfaction of LACDPW. Conformance shall be demonstrated as part of final parcel improvement plans. Additionally, the final selection of BMP categories will be informed by a parcel-scale assessment of infiltration feasibility to meet the BMP selection hierarchy of the LID Performance Standard. Therefore, the proposed application of parcel-based LID BMPs conforms to the BMP selection requirements of the LID Performance Standard.

For the segments of Franklin Parkway and Hancock Parkway located within the project boundary, stand-alone right-of-way (ROW) LID BMPs within the public roadways will be used to meet the full requirements of the LID Performance Standard. Based on the very low expected infiltration rates of engineered fill (Engeo, 2021) along the parkways, Category 2 (bioinfiltration) LID is preliminarily proposed to provide treatment for the parkways. If infiltration is deemed infeasible due to factors including but not limited to geotechnical risks, setbacks from slopes, utility alignment or depth to groundwater during the final design of the ROW LIDs, the proposed LID will be lined and converted to Category 3 (biofiltration).

Factors considered in selection and placement of LID BMPs as part of final parcel and street improvement plans shall include soil infiltration rates, geotechnical risks, setbacks from structures, slopes, and utility alignments, depth to groundwater, programmed density/uses of the parcel, and other factors deemed relevant as part of LACDPW review of final parcel improvement plans. Areas that are suitable for infiltration shall be considered as part of site design and BMP placement within parcels.

Through the initial screening conducted and the commitment to perform detailed feasibility evaluation at the time of final parcel or street improvement plans, this memorandum demonstrates Project BMPs have been selected in a manner consistent with the LID selection hierarchy (i.e., infiltration feasibility criteria) contained in the Project LID Performance Standard.

[3] Plan Case Number: ESTU2022000055

3.2 Right-of-Way LID BMPs

Segments of Franklin Parkway and Hancock Parkway within the Project boundary are proposed to be treated by stand-alone ROW LIDs. These areas are categorized as "Right-of-way LID Treatment" in Figure 2. The ROW LIDs proposed for the parkways were proposed to be linear bioinfiltration strips located parallel to the roadway. The bioinfiltration LID occupies approximately 20% of the width of the parkways. Approximately 25% of the length of each bioinfiltration strip unit is proposed to be concrete pretreatment compartment with rocks at the bottom. The forebay receives runoff from the parkways via curb inlets, reduces the amount of trash, debris and sediment entering the biofiltration media, then discharges the pretreated stormwater into the biofiltration compartment via overflow weir and weep holes. A preliminary design of these linear biofiltration strips is provided in Attachment A of this memorandum.

The LID Performance Standard requires that ROW BMPs to be selected and sized to retain the volume of stormwater runoff produced from a 1.1-inch storm event (i.e., the LID Design Volume) for the Project site. Where it has been demonstrated that 100 percent of the LID Design Volume cannot be feasibly infiltrated, biofiltration shall be provided for 1.5 times the portion of the LID Design Volume that is not retained.

Table 3-1 summarizes the inputs and outputs in HydroCalc. Model files are provided in Attachment B.

Table 3-1 HydroCalc Inputs and Outputs for Drainage Areas Proposed to be Treated by ROW LID

	Franklin Parkway	Hancock Parkway
HydroCalc Inputs		
Area (acres)	5.7	6.6
Length (feet)	250	250
Slope	0.05	0.05
Depth (inches)	1.1	1.1
Imperviousness[1]	0.91	0.91
Soil Type	097	020
Storm Frequency	85th percentile storm	
HydroCalc Outputs		
Clear Peak Flow Rate (cfs)	2.2	2.5
24-hr Clear Runoff Volume (cubic feet)	18,643	21,570
Upsized Runoff Volume (150%) for Biofiltration Sizing (cubic feet)	27,965	32,356

In the preliminary design, the bioinfiltration strip is proposed to be 10-feet wide with 2-foot of media bed width. A total of 6,470 linear feet of bioinfiltration strip is proposed for Hancock Parkway and a total of 4,180 feet of bioinfiltration strip is proposed for Franklin Parkway. These bioinfiltration strips are proposed with 12 inches of ponding depth, 24 inches of media layer, a gravel layer underneath and perforated underdrains in the gravel layer to discharge the biofiltered runoff. This vertical profile provides an effective storage depth of 18 inches is provided, assuming 25 percent porosity for the media layer (Virginia Department of Conservation and Recreation, 2011).

Table 3-2 summarizes the dimensions of the bioinfiltration LIDs for both parkways based on the proposed design and how the LIDs meet the applicable sizing standards.

Table 3-2 Sizing Conformance Demonstration for ROW LID BMP

Drainage Area	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)	Provided Static Biofiltra-tion Volume (cubic feet)	Provided Biofiltra-tion Footprint (square feet)	Additional Volume Biofiltered During Storm Duration (cubic feet)[1]	Total Provided Biofiltration Volume (Static+ Routed Volume, cubic feet)	Drawdown Time to Media Surface hours[2]
Franklin Pkwy.	27,965	18,808	12,538	31,346	50,154	2.4
Hancock Pkwy.	32,357	29,114	19,410	48,524	77,638	2.4

1 – Based on a conservative design storm routing time of 6 hours (reduced from HydroCalc duration of 24-hours) and media flowrate of 5 inches per hour over the footprint of the BMP.
2- Based on 12-inch ponding depth and 5 in/hr media flowrate.

As shown in Table 3-2, the total provided biofiltered volume for the ROW LIDs proposed for the two parkways is substantially more than 150% of runoff volume from the 1.1-inch 85th percentile storm while drawing down completely within 3 hours. Incidental infiltration is not considered in this analysis as a conservative assumption. The required biofiltration volumes for Franklin Parkway and Hancock Parkway are 27,965 cubic feet and 32,357 cubic feet, respectively, while the total provided biofiltration volumes are 50,154 cubic feet and 77,638 cubic feet, respectively. Therefore, the proposed biofiltration ROW LID fully complies with the requirement to retain or provide biofiltration 150% of runoff from the 85th percentile, 24-hour storm event. These ROW LID facilities are also sized to treat 80 percent of average annual runoff volume (not demonstrated in this memorandum), which is why they have excess capacity to treat the runoff from the 85th percentile storm event.

3.3 Parcel-Based LID BMPs

Parcel-based LID BMPs will be implemented as part of final parcel improvements for the commercial parcels and surrounding access roads (Figure 1) in the Project area. These areas are categorized as "Parcel-Based LID Treatment" in Figure 2. The LIDs in the commercial parcels will be owned and maintained by property owner associations (POAs) and the LIDs for the access roads will be owned and maintained by LACDPW with funding through a CFD. Parcel-based BMPs will be selected and sized per the LID Performance Standard in Section 2. Final sizing calculations will be prepared as part of final parcel improvement plans. Factors considered in selection and placement of parcel-based LID BMPs as part of final parcel improvement plans shall include soil infiltration rates, geotechnical risks, setbacks from structures, slopes, and utility alignments, depth to groundwater, programmed density/uses of the parcel, and other factors deemed relevant as part of LACDPW review of final parcel improvement plans. Areas that are suitable for infiltration shall be considered as part of site design and BMP placement within parcels.

Infiltration parcel-based BMPs include bioretention without an underdrain (RET-1[4]), infiltration basins (RET-2[4]) or trenches (RET-3[4]), permeable pavement (RET-5[4]), or an equivalent infiltration BMPs. Bioinfiltration and biofiltration parcel-based BMPs are associated with BMP type BIO-1 under the LID Standards Manual. The design and maintenance of these parcel-based BMPs shall be consistent with the specifications detailed on the LID Standards Manual for the respective BMP type proposed for the Project (LACDPW, 2014).

Appropriate pretreatment, such as forebays, vegetated swales and filter strips will be designed as part of final parcel improvements and installed upstream of the parcel-based BMPs. These pretreatment devices capture sediment, trash, and debris and increases the longevity of the downstream BMPs. Inclusion of pretreatment for BMPs is consistent with the LID Standards Manual (LACDPW, 2014).

Parcel-based LIDs will be sized with a static volume equivalent to the 1.1-inch LID Design Volume for each parcel area. An underdrain will be used for Category 2 and 3. By following this sizing approach, we demonstrate that the sizing standard above is met regardless of the infiltration feasibility category that is determined.

HydroCalc was used to generate the 1.1" LID Design Volume assuming flow path width of 250 feet and catchment slope of 5%. The imperviousness of each parcel is based on land use and the dominant LA County soil types (020 or 097) underlay each planning area treated by parcel-based LID is used as soil type input. The HydroCalc inputs and outputs for each parcel are summarized ~~in Table 3-3. Model files are~~ provided in Attachment B.

[4] Equivalent BMP Type on the LID Standards Manual (LACDPW, 2014)

Table 3-3 HydroCalc Inputs and Outputs for Parcels Treated by Parcel-based LID BMPs

Parcel ID	Area (ac)	Land Use	Imperv.	Soil Type	Length (ft.)	Slope	24-hr Clear Runoff Volume (cu. ft.)	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)
1	9.5	Commercial	91%	020	250	0.05	31,100	46,650
2.1	13.0	Commercial	91%	020			42,800	64,200
2.2	10.4	Commercial	91%	020			34,014	51,021
2.3	18.4	Commercial	91%	020			60,254	90,381
3.1	19.2	Commercial	91%	020			62,950	94,425
3.2	3.8	Commercial	91%	020			12,600	18,900
3.3a	13.7	Commercial	91%	097			44,974	67,461
3.3b	11.2	Commercial	91%	097			36,716	55,073
3.3c	4.1	Commercial	91%	097			13,373	20,060
3.3d	16.8	Commercial	91%	020			55,073	82,609
Access Road	9.3	Commercial	91%	020			30,451	45,676

If parcel-scale infiltration feasibility study shows that Category 1 (infiltration) BMP is feasible for any parcel proposed to be treated by parcel-based LID BMPs, infiltration BMPs already sized with the static volume equivalent to the LID Design Volume will be able to retain 100% of the LID Design Volume.

If parcel-scale infiltration feasibility study shows that Category 2 (bioinfiltration) or Category 3 (biofiltration) BMP is feasible for any parcel, LID BMPs sized with the static volume equivalent to the LID Design Volume still include an underdrain and media bed with adequate capacity to biofilter 150% of the LID Design Volume with reasonable BMP design assumptions including:

- 12 inches of ponding depth, 24 inches of media layer and a gravel layer underneath with perforated, resulting in 18 inches of effective depth with an assumed media porosity of 0.25 (neglecting the gravel storage);
- 5 inches per hour media filtration rate (the lower limit of the range of filtration rate recommended by the LID Standards Manual);
- 6 hours of routing period during the 24-hour design storm duration (conservative assumption);
- Incidental infiltration into the underlaying soils for Category 2 BMP is not considered (conservative assumption);

Because infiltration is not considered in this analysis, both Category 2 and Category 3 parcel-based LID designs provide an effective storage depth of 18 inches between the ponding and media layer and are identical for the purpose of the conformance analysis. Where some infiltration does occur, the resulting performance would be greater.

The total volume biofiltered is the sum of the static biofiltration volume and the additional volume routed during the storm event. This additional biofiltration volume was calculated by multiplying the media filtration rate (5 inches per hour) by routing time (6 hours) and the provided biofiltration footprint of each parcel. The total capacity of the parcel-based LID is calculated by adding the provided static biofiltration volume and the additional routed biofiltered volume. This sizing conformance demonstration calculation for each parcel is shown in Table 3-4.

Table 3-4 shows that providing a static LID volume equal to the runoff from the 1.1" storm results in conformance with sizing criteria regardless of the eventual infiltration feasibility category:

- Where parcels are Category 1, the static volume provided in the LID BMPs (Column D) is equal to the required volume (Column B) without considering any routing. The drawdown (Column H) is well within the 96-hour limit.

- Where parcels are Category 2 or 3, the total biofiltered volume (Column G) substantially exceeds the required biofiltration volume (Column C), even without considering any incidental infiltration and using a conservatively short routing time.

In summary, this sizing analysis demonstrates that parcel-based LIDs sized to the full LID Design Volume can achieve retention or equivalent biofiltration of the LID Design Volume regardless of feasibility conditions that may be encountered during the final parcel improvement phase of the Project.

Table 3-4 Sizing Conformance Demonstration for Parcel-Based LID BMPs in VCC

A	B	C	D	E	F	G	H	I
Parcel ID	**Required Infiltration Volume (if Category 1 Parcel) (cubic-feet)**	**Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet) (if Category 2 or 3 Parcel)**	**Provided Static LID Volume (cubic feet)**	**Provided LID Footprint (square feet)**	**Additional Volume Biofiltered During Storm Duration from Category 2 or 3 BMPs (cubic feet)[1]**	**Total Biofiltration Volume in Category 2 or 3 BMPs (Static+ Routed Volume, cu-ft)**	**Drawdown of Stored Volume in Category 1 (hours)[2]**	**Drawdown to Media Surface in Category 2 or 3 (hours)[3]**
1	31,100	46,650	31,100	20,733	51,833	82,933	12 - 24	2.4
2.1	42,800	64,200	42,800	28,533	71,333	114,133	12 - 24	2.4
2.2	34,014	51,021	34,014	22,676	56,690	90,704	12 - 24	2.4
2.3	60,254	90,381	60,254	40,169	100,423	160,677	12 - 24	2.4
3.1	62,951	94,427	62,951	41,967	104,918	167,869	12 - 24	2.4
3.2	12,600	18,900	12,600	8,400	21,000	33,600	12 - 24	2.4
3.3a	44,974	67,461	44,974	29,983	74,957	119,931	12 - 24	2.4
3.3b	36,716	55,074	36,716	24,477	61,193	97,909	12 - 24	2.4
3.3c	13,373	20,060	13,373	8,915	22,288	35,661	12 - 24	2.4
3.3d	55,073	82,610	55,073	36,715	91,788	146,861	12 - 24	2.4
Access Road	30,451	45,677	30,451	20,301	50,752	81,203	12 - 24	2.4

1 – Based on a conservative design storm routing time of 6 hours (reduced from HydroCalc duration of 24-hours) and media flowrate of 5 inches per hour over the footprint of the BMP.
2 – Based on ponding depth of 12 inches and 1 to 2 in/hr infiltration rates, consistent with likely rates in Category 1 areas.
3 – Based on 12-inch ponding depth and 5 in/hr media flowrate.

4. HYDROMODIFICATION EXEMPTION DEMONSTRATION

Hydromodification exemptions are described in Section F.2.b of the MS4 Permit and in the LACDPW LID Standards Manual. The exemptions that apply to the Project are:

- *Projects that discharge directly or through a storm drain into concrete or otherwise engineered channel (i.e., channelized or armored with rip-rap, shotcrete), which, in turn, discharge into receiving water that is not susceptible to hydromodification impacts;*
- *Projects that have any increased discharge directly or via a storm drain to a sump, lake, are under tidal influence, into a waterway that has a 100-year peak flow (Q100) of 25,000 cfs or more, or other receiving water that is not susceptible to hydromodification impacts.*

All planning areas within the Project are exempt from HM requirements based on storm drain discharge locations shown on the *LID Exhibit* (Attachment A) and the HM susceptibility of the receiving waterbodies (Castaic Creek and Hasley Creek). HM exemption for planning areas proposed to be discharged into two receiving waterbodies are demonstrated below respectively:

- **Planning Areas (PAs) 1, 2.1, 2.2 and 2.3** drain into a reach of Castaic Creek between Commerce Center Drive and Old Road. The Project includes bank stabilization measures throughout this reach of the Castaic Creek. The bank stabilization measures include adding grade control structures which are intended to reduce erosion concerns after the project is completed (PACE, 2019). Additionally, downstream of the confluence with Hasley Creek, the clear 100-year flowrate is 28,000 cfs according to the Castaic Creek Special Study conducted by LA County (LA County, 2005), which is greater than 25,000 cfs.

- **PAs 3.1, 3.2 and 3.3** discharge into Hasley Creek. The Project includes engineering and stabilization of Hasley Creek based on a plan prepared by PACE Engineering (PACE, 2021). The proposed channel stabilization on Hasley Creek includes adding grade control structures and soil-cement bank stabilization, which are intended to reduce erosion potential of the channel up to the 100-year storm. This will modify the existing Hasley Creek channel into an engineered channel that is exempt from HM requirements. Water then discharges to the Castaic Creek, which has a 100-year flowrate greater than 25,000 cfs downstream of the confluence with Hasley Creek (LA County, 2005) and is also exempt from hydromodification per the previous bullet.

5. CONFORMANCE SUMMARY

In summary, this memorandum demonstrates that:

- Project BMPs have been selected in a manner consistent with the LID selection hierarchy (i.e., infiltration feasibility criteria) contained in the Project LID Performance Standard (Section 3.1), which is also consistent with the 2021 MS4 Permit;
- The BMPs proposed as part of the Project will infiltrate runoff from the 85th percentile, 24-hour (1.1-inch) design storm (LID Design Volume) to the extent feasible and provide biofiltration for 150 percent of the LID Design Volume that is not reliably retained (Section 3.2 and 3.3), which is also consistent with the 2021 MS4 Permit;
- All planning areas within the Project are exempt from the hydromodification controls requirement (Section 4)

For areas treated solely by parcel-based BMPs (Figure 2), the BMPs shall be selected and sized to the satisfaction of LACDPW as part of final parcel improvement plans. Based on the commitments described in Section 4.2, the application of parcel-based BMPs to these areas will satisfy the BMP selection and LID design storm retention and biofiltration requirement in the LID Performance Standard. The basis for this finding is documented in Section 3.2, and the availability of space in typical parcel plans has been demonstrated.

6. REFERENCES

Geosyntec Consultants, 2010. Newhall Ranch Specific Plan Sub-Regional Stormwater Mitigation Plan. Prepared for Newhall Land by Geosyntec Consultants. April 2009, amended March 2010.

Leighton, 2016. Preliminary Geotechnical Investigation of Infiltration Feasibility for Low Impact Development (LID) Design Features, Vesting Tentative Parcel Map 18108, Valencia Commerce Center, Los Angeles County, California. Prepared for Newhall Land by Leighton and Associates, January 2016.

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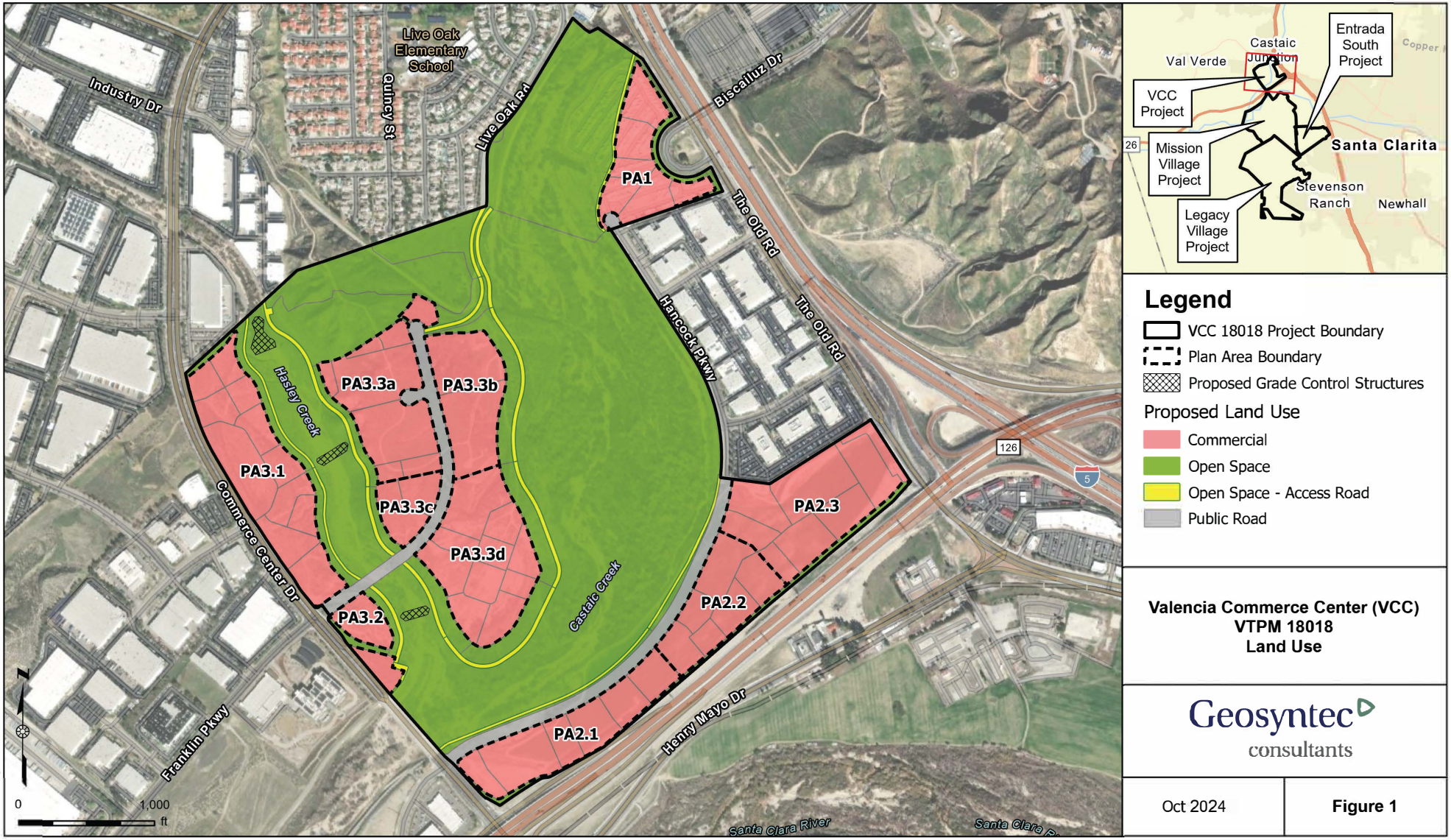
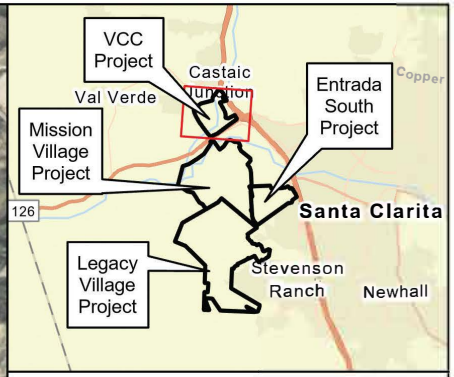
Figures



Valencia Commerce Center (VCC)
VTPM 18018
Land Use

Geosyntec consultants

Oct 2024	**Figure 1**



Legend

- VCC 18018 Project Boundary
- Plan Area Boundary
- Proposed Grade Control Structures

Proposed Treatment BMP Categories

- Debris-Producing Open Space Bypassing Treatment
- Parcel Based LID
- Right-of-Way LID

Valencia Commerce Center (VCC)
VTPM 18018
Drainage Area and Treatment Categories

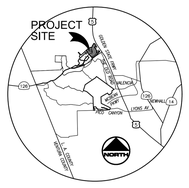
Geosyntec consultants

Oct 2024	**Figure 2**

Attachments

Attachment A

VCC LID Exhibit Map



VICINITY MAP
NOT TO SCALE

BIORETENTION AREA CATEGORY 1 | PARKING LOT TRIBUTARY AREA

NOTES

1. OVERFLOW DEVICE: VERTICAL RISER OR EQUIVALENT
2. OPTIONAL CHOKING GRAVEL LAYER
3. 2" MIN PLANTING MIX; 3" PREFERRED.

TYPICAL BIORETENTION DETAIL FOR PARCEL BASED LID (CATEGORY 1)
NTS

LEGEND:

- BOUNDARY LINE
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- PARCEL BASED LID FOR PLANNING AREAS
- PARCEL BASED LID FOR ACCESS ROADS
- RIGHT–OF–WAY LID
- OPEN SPACE–BYPASSING TREATMENT
- AVAILABLE LID FOOTPRINT FOR PARCEL BASED LID
- AVAILABLE LID FOOTPRINT FOR RIGHT–OF–WAY LID

NOTE:

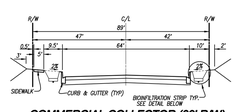
(A) ALL PROPOSED CATCH BASINS SHALL BE INSTALLED WITH ARS (AUTOMATIC RETRACTABLE SCREENS) AND CPS (CONNECTOR PIPE SCREEN).

BIOFILTRATION AREA CATEGORY 2 & 3 | PARKING LOT TRIBUTARY AREA

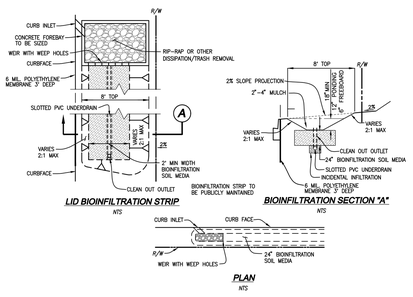
NOTES

1. OVERFLOW DEVICE: VERTICAL RISER OR EQUIVALENT
2. PERFORATED 6" MIN PVC PIPE UNDERDRAIN SYSTEM. WHERE SOIL CONDITIONS ALLOW, OMIT THE UNDERDRAIN AND INSTALL AN APPROPRIATELY SIZED GRAVEL DRAINAGE LAYER (TYPICALLY A WASHED 57 STONE) BENEATH THE PLANTING MEDIA FOR ENHANCED INFILTRATION.
3. OPTIONAL CHOKING GRAVEL LAYER
4. 2" MIN PLANTING MIX; 3" PREFERRED.
5. LINER NOT REQUIRED FOR CATEGORY 2. LINER IS REQUIRED FOR CATEGORY 3.

TYPICAL BIOINFILTRATION DETAIL FOR PARCEL BASED LID (CATEGORY 2 & 3)
NTS



COMMERCIAL COLLECTOR (89' R/W)
(FRANKLIN PARKWAY, HANCOCK PARKWAY)
NTS



LID BIOINFILTRATION STRIP NTS

BIOINFILTRATION SECTION "A" NTS

PLAN NTS

TYPICAL BIOINFILTRATION DETAIL FOR RIGHT-OF-WAY LID

ROW LID Drainage Area	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)	Provided Static Biofiltration Volume (cubic feet)	Provided Biofiltration Footprint (square feet)	Additional Volume Biofiltered During Storm Duration (cubic feet)	Total Provided Biofiltration Volume (Static+ Routed Volume, cubic feet)	Drawdown Time to Media Surface (hours)
Franklin Parkway	27,965	18,808	12,538	31,346	50,154	2.4
Hancock Parkway	32,357	29,114	19,410	48,524	77,638	2.4

Parcel-Based LID Drainage Area	For Category 1 Parcel-based LIDs		For Category 2 and Category 3 Parcel-based LIDs				
	Required Infiltration Volume	Drawdown of Stored Volume in Category 1 (hours)	Required Biofiltration Volume (150% of the LID Design Volume) (cubic feet)	Provided Static LID Volume (cubic feet)	Provided LID Footprint (square feet)	Additional Volume Biofiltered During Storm Duration (cubic feet)	Total Biofiltration Volume (Static+ Routed Volume, cu-ft)	Drawdown Time to Media Surface (hours)
Planning Area 1	31,100	12 to 24	46,650	31,100	20,733	51,833	82,933	2.4
Planning Area 2.1	42,800	12 to 24	64,200	42,800	28,533	71,333	114,133	2.4
Planning Area 2.2	34,014	12 to 24	51,021	34,014	22,676	56,690	90,704	2.4
Planning Area 2.3	60,254	12 to 24	90,381	60,254	40,169	100,423	160,677	2.4
Planning Area 3.1	62,951	12 to 24	94,427	62,951	41,967	104,918	167,869	2.4
Planning Area 3.2	12,600	12 to 24	18,900	12,600	8,400	21,000	33,600	2.4
Planning Area 3.3a	44,974	12 to 24	67,461	44,974	29,983	74,957	119,931	2.4
Planning Area 3.3b	36,716	12 to 24	55,074	36,716	24,477	61,193	97,909	2.4
Planning Area 3.3c	13,373	12 to 24	20,060	13,373	8,915	22,288	35,661	2.4
Planning Area 3.3d	55,073	12 to 24	82,610	55,073	36,715	91,788	146,861	2.4
Open Space - Access Road	30,451	12 to 24	45,677	30,451	20,301	50,752	81,203	2.4

NORTH

FEET 100' 50' 0 100' 200'
INCHES 1 1/2 0 1 2

VALENCIA COMMERCE CENTER
LID EXHIBIT

HUNSAKER & ASSOCIATES LOS ANGELES, INC.
PLANNING • ENGINEERING • SURVEYING
26074 Avenue Hall, Suite #23 • Valencia, CA 91355
FX: (661) 294-9890 • PH: (661) 294-2211

DATE: 01/17/2024 REV. DATE: 01/30/2024
PROJECT NO: SHEET 1 OF 1

HCC060-VCC LID Exhibit.dwg

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Attachment B

Model Files

engineers | scientists | innovators

Geosyntec consultants

ATTACHMENT B: HYDROCALC INPUTS AND OUTPUTS

HydroCalc Parcel-Based and Right-of-Way LIDs, Inputs Table

HydroCalc Parcel-Based and Right-of-Way LIDs, Output Files

HydroCalc Inputs – Parcel-Based and ROW LIDs						
Subarea ID	**PA-1**	**PA-2.1**	**PA-2.2**	**PA-2.3**	**PA-3.1**	**PA-3.2**
Area (ac)	9.5	13.0	10.4	18.4	19.2	3.8
Flow Path Length (ft)	250	250	250	250	250	250
Flow Path Slope (vft/hft)	0.05	0.05	0.05	0.05	0.05	0.05
85th Percentile Rainfall Depth (in)	1.1	1.1	1.1	1.1	1.1	1.1
Percent Impervious	0.91	0.91	0.91	0.91	0.91	0.91
Soil Type	20	20	20	20	20	20
Design Storm Frequency	85th percentile storm	85th percentile storm	85th percentile storm	85th percentile storm	85th percentile storm	85th percentile storm
Fire Factor	0	0	0	0	0	0

HydroCalc Inputs – Parcel-Based and ROW LIDs, Continued							
Subarea ID	**PA-3.3a**	**PA-3.3b**	**PA-3.3c**	**PA-3.3d**	**Franklin ROW**	**Hancock ROW**	**Access Road**
Area (ac)	13.7	11.2	4.1	16.8	5.7	6.6	9.3
Flow Path Length (ft)	250	250	250	250	250	250	250
Flow Path Slope (vft/hft)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
85th Percentile Rainfall Depth (in)	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Percent Impervious	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Soil Type	97	97	97	20	97	20	20
Design Storm Frequency	85th percentile storm	85th percentile storm	85th percentile storm	85th percentile storm	85th percentile storm	85th percentile storm	85th percentile storm
Fire Factor	0	0	0	0	0	0	0

Peak Flow Hydrologic Analysis

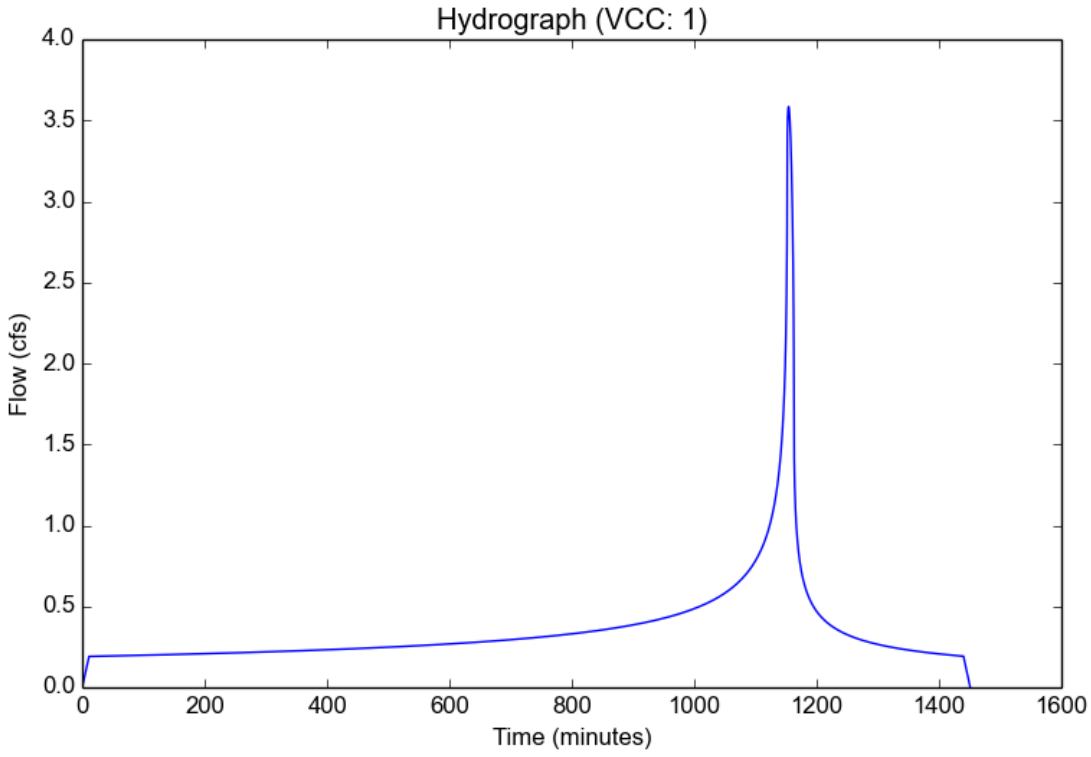
File location: P:/Clients/Newhall_Land/Projects/CWR0782_ES_VCC_Hydrology_2022/VCC/Conformance Memo/Round_5_RTC_Oct24/Updated Submitt
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	1
Area (ac)	9.481219
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.1723
Developed Runoff Coefficient (Cd)	0.8345
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	3.5847
Burned Peak Flow Rate (cfs)	3.5847
24-Hr Clear Runoff Volume (ac-ft)	0.714
24-Hr Clear Runoff Volume (cu-ft)	31100.4997



Peak Flow Hydrologic Analysis

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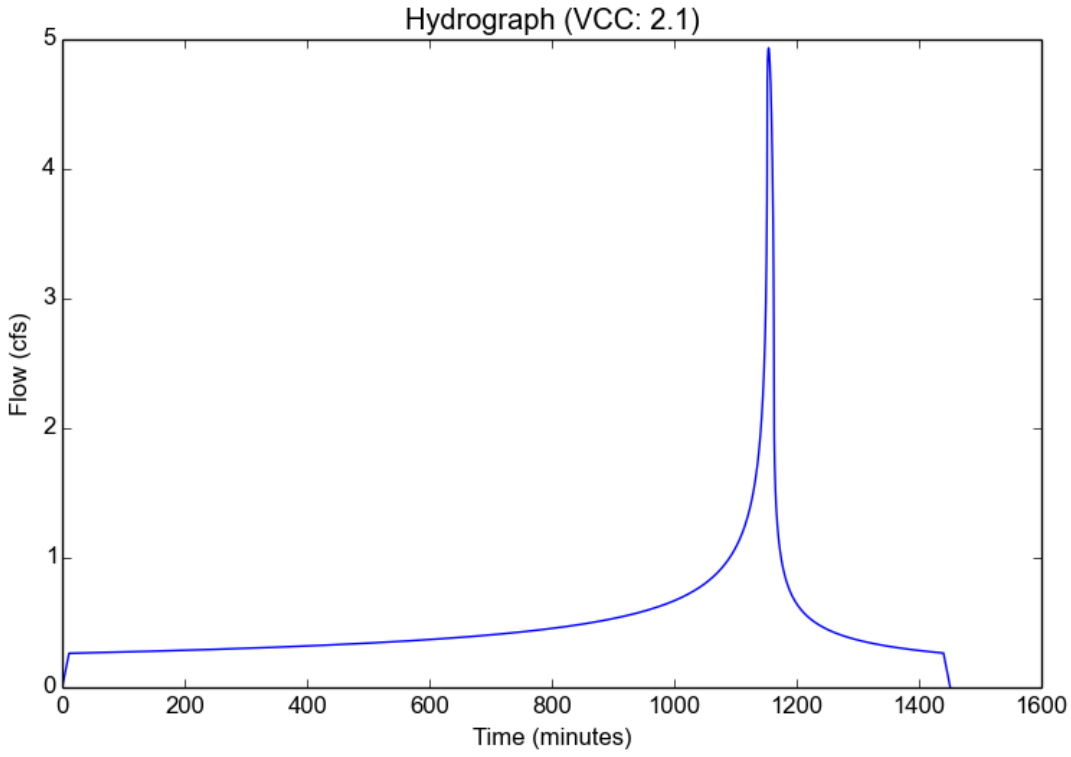
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	2.1
Area (ac)	13.04798
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.1723
Developed Runoff Coefficient (Cd)	0.8345
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	4.9332
Burned Peak Flow Rate (cfs)	4.9332
24-Hr Clear Runoff Volume (ac-ft)	0.9826
24-Hr Clear Runoff Volume (cu-ft)	42800.2663



Peak Flow Hydrologic Analysis

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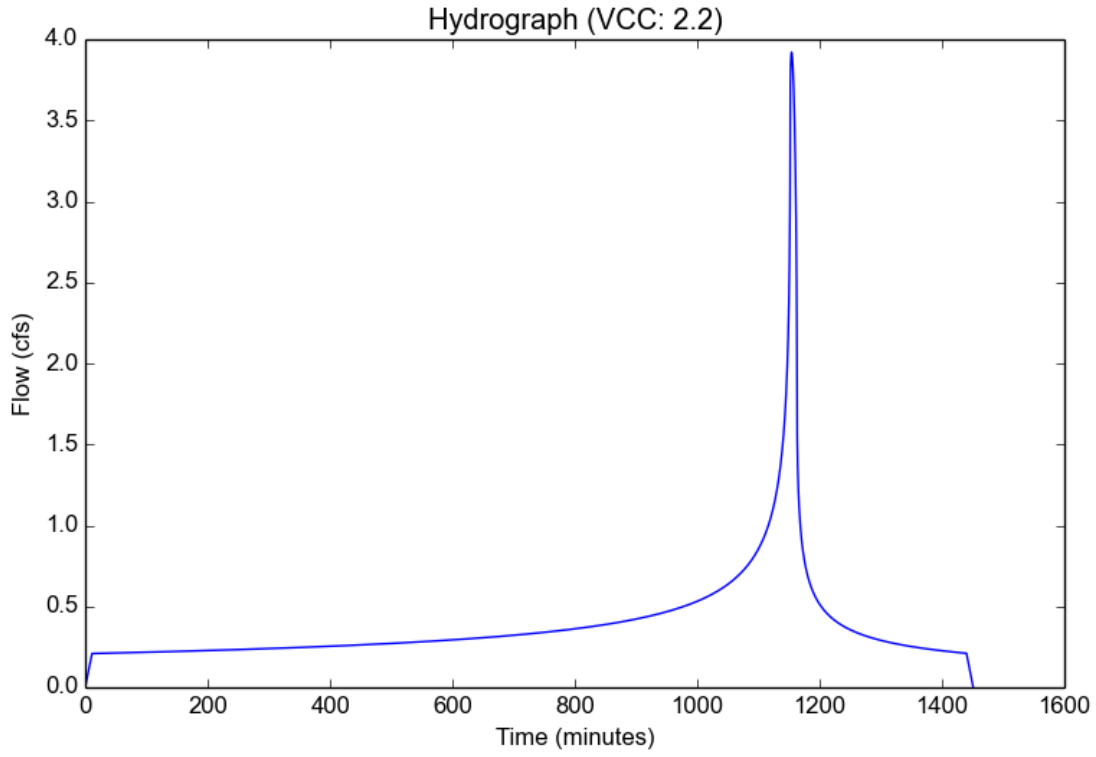
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	2.2
Area (ac)	10.369534
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.1723
Developed Runoff Coefficient (Cd)	0.8345
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	3.9206
Burned Peak Flow Rate (cfs)	3.9206
24-Hr Clear Runoff Volume (ac-ft)	0.7809
24-Hr Clear Runoff Volume (cu-ft)	34014.3698



Peak Flow Hydrologic Analysis

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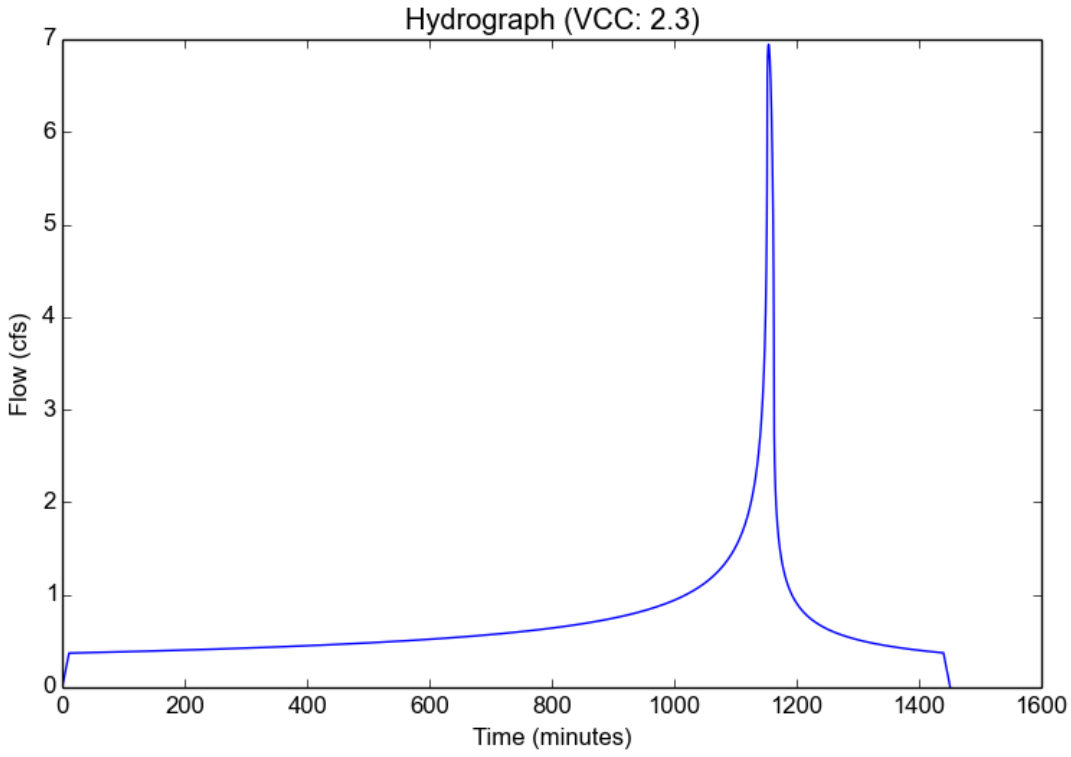
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	2.3
Area (ac)	18.368957
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.1723
Developed Runoff Coefficient (Cd)	0.8345
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	6.945
Burned Peak Flow Rate (cfs)	6.945
24-Hr Clear Runoff Volume (ac-ft)	1.3832
24-Hr Clear Runoff Volume (cu-ft)	60254.2501



Peak Flow Hydrologic Analysis

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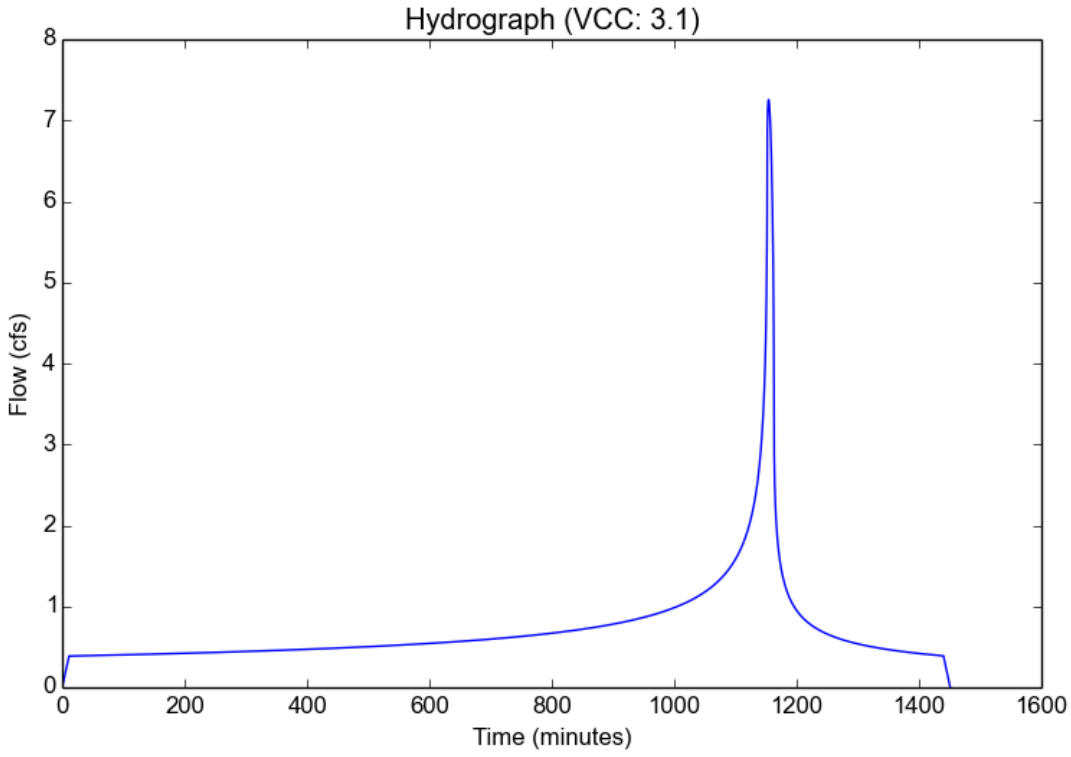
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	3.1
Area (ac)	19.190967
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.1723
Developed Runoff Coefficient (Cd)	0.8345
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	7.2558
Burned Peak Flow Rate (cfs)	7.2558
24-Hr Clear Runoff Volume (ac-ft)	1.4451
24-Hr Clear Runoff Volume (cu-ft)	62950.6251



Peak Flow Hydrologic Analysis

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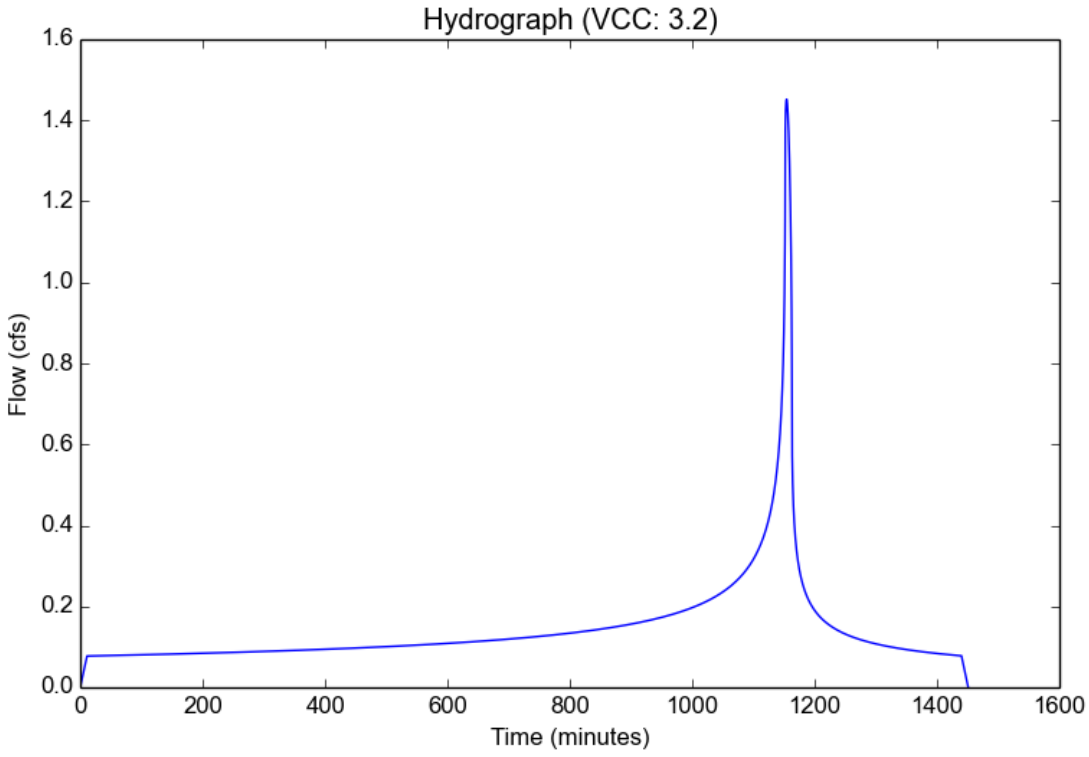
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	3.2
Area (ac)	3.841175
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.1723
Developed Runoff Coefficient (Cd)	0.8345
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	1.4523
Burned Peak Flow Rate (cfs)	1.4523
24-Hr Clear Runoff Volume (ac-ft)	0.2893
24-Hr Clear Runoff Volume (cu-ft)	12599.9053



Peak Flow Hydrologic Analysis

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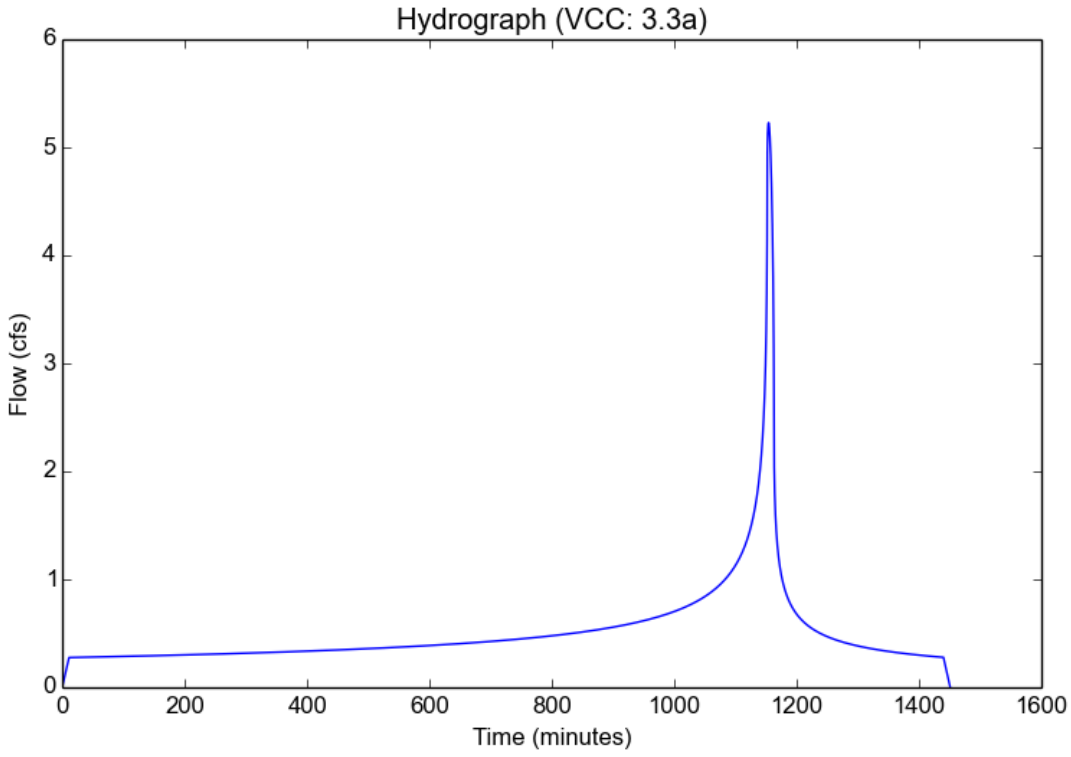
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	3.3a
Area (ac)	13.704784
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	97
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.257
Developed Runoff Coefficient (Cd)	0.8421
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	5.2289
Burned Peak Flow Rate (cfs)	5.2289
24-Hr Clear Runoff Volume (ac-ft)	1.0325
24-Hr Clear Runoff Volume (cu-ft)	44974.1299



Peak Flow Hydrologic Analysis

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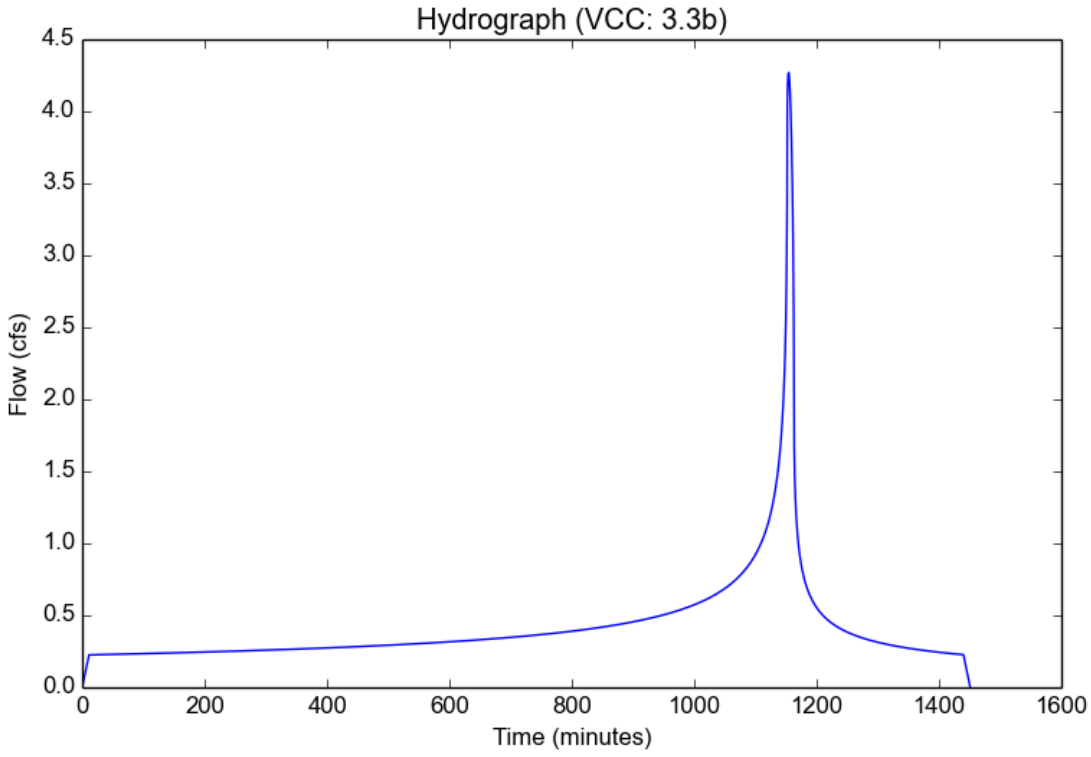
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	3.3b
Area (ac)	11.188287
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	97
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.257
Developed Runoff Coefficient (Cd)	0.8421
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	4.2687
Burned Peak Flow Rate (cfs)	4.2687
24-Hr Clear Runoff Volume (ac-ft)	0.8429
24-Hr Clear Runoff Volume (cu-ft)	36715.8996



Peak Flow Hydrologic Analysis

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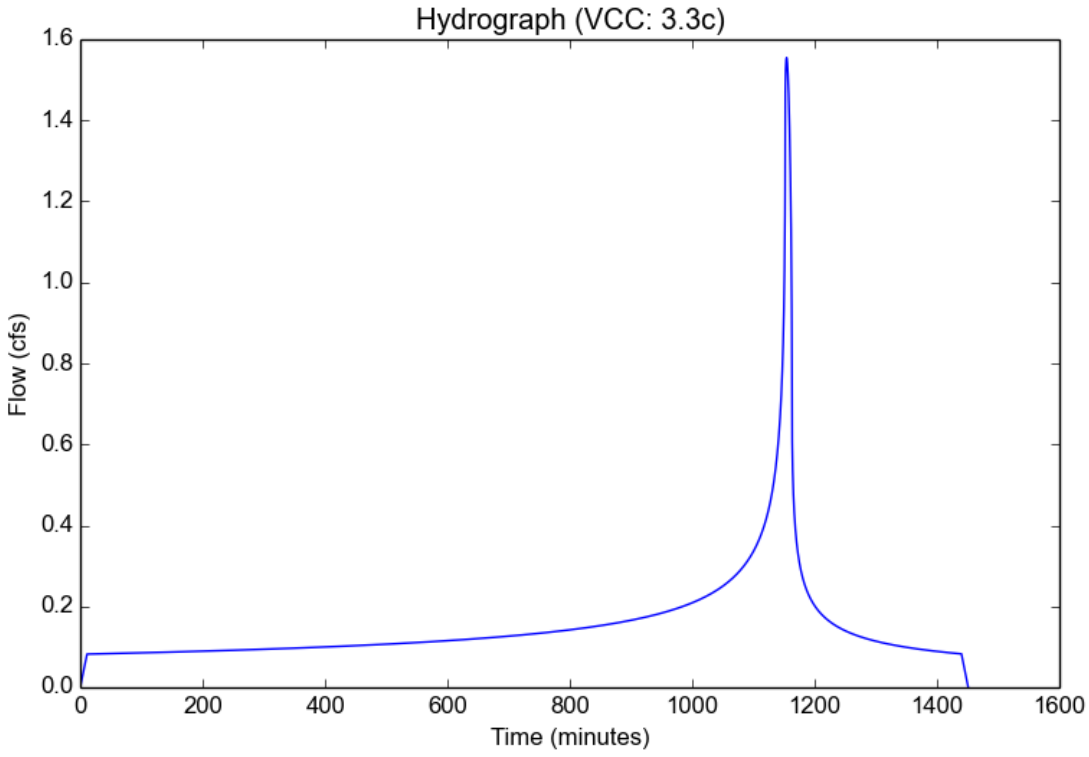
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	3.3c
Area (ac)	4.075121
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	97
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.257
Developed Runoff Coefficient (Cd)	0.8421
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	1.5548
Burned Peak Flow Rate (cfs)	1.5548
24-Hr Clear Runoff Volume (ac-ft)	0.307
24-Hr Clear Runoff Volume (cu-ft)	13373.0689



Peak Flow Hydrologic Analysis

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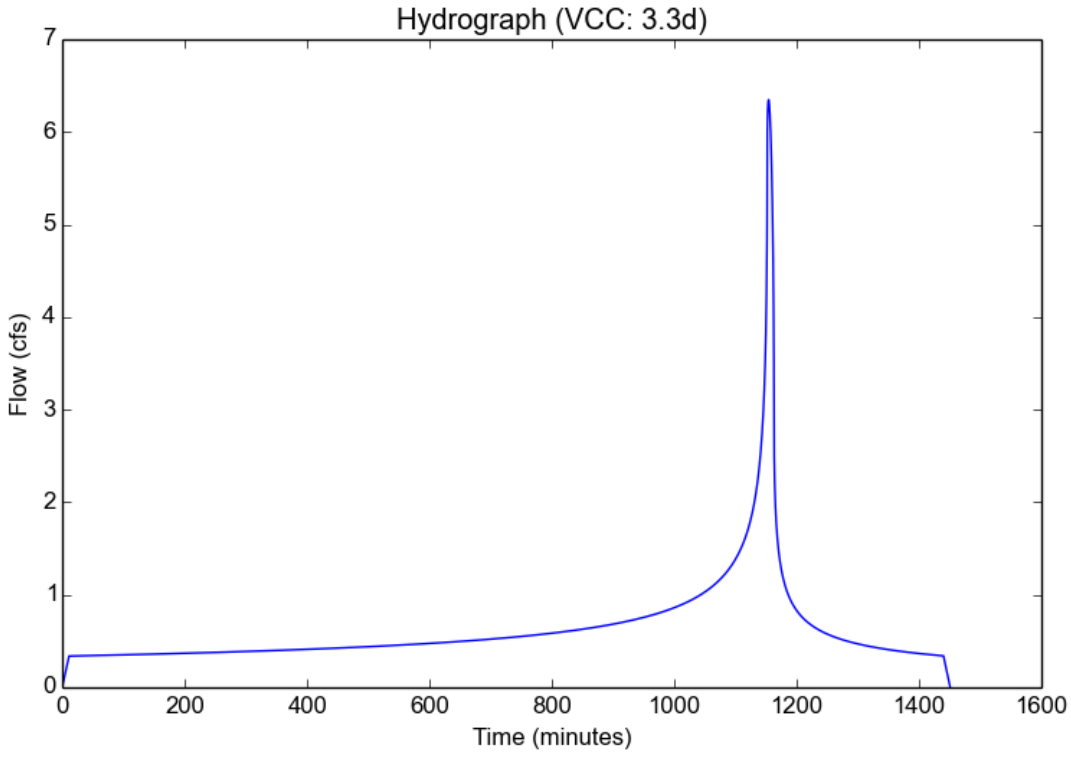
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	3.3d
Area (ac)	16.789351
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.1723
Developed Runoff Coefficient (Cd)	0.8345
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	6.3478
Burned Peak Flow Rate (cfs)	6.3478
24-Hr Clear Runoff Volume (ac-ft)	1.2643
24-Hr Clear Runoff Volume (cu-ft)	55072.7924



Peak Flow Hydrologic Analysis

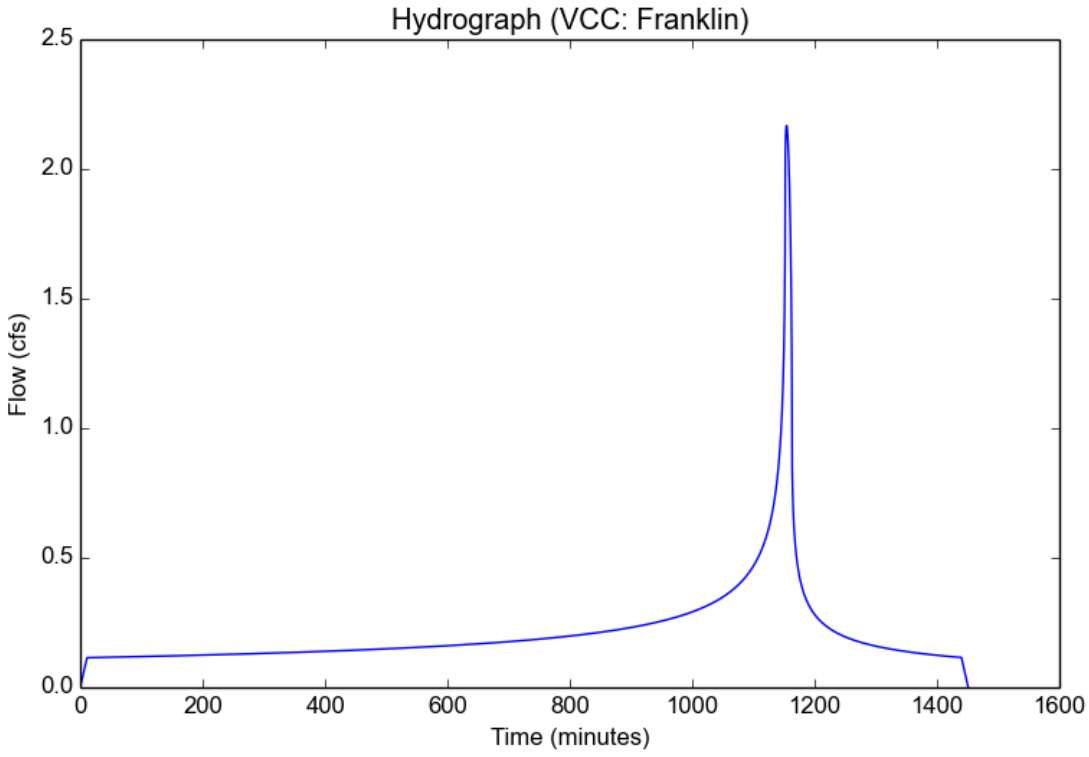
File location: P:/Clients/Newhall_Land/Projects/CWR0782_ES_VCC_Hydrology_2022/VCC/Conformance Memo/Round_5_RTC_Oct24/Updated Submitt
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	Franklin
Area (ac)	5.681071
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	97
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.257
Developed Runoff Coefficient (Cd)	0.8421
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	2.1675
Burned Peak Flow Rate (cfs)	2.1675
24-Hr Clear Runoff Volume (ac-ft)	0.428
24-Hr Clear Runoff Volume (cu-ft)	18643.2143



Peak Flow Hydrologic Analysis

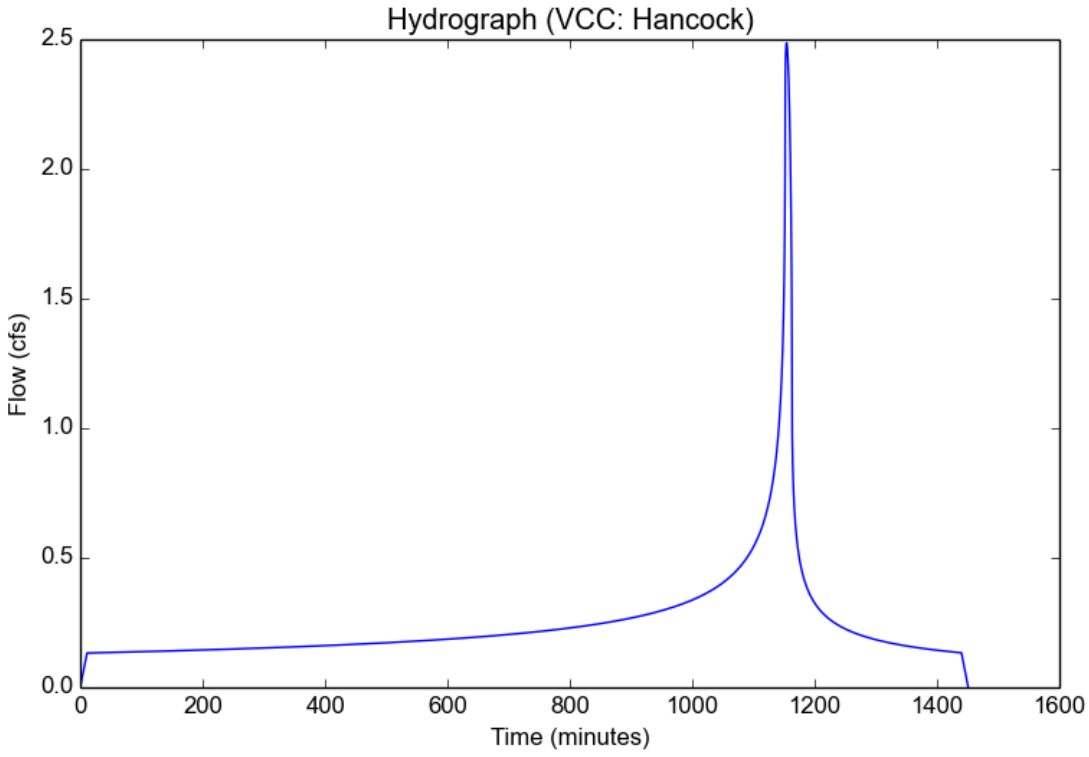
File location: P:/Clients/Newhall_Land/Projects/CWR0782_ES_VCC_Hydrology_2022/VCC/Conformance Memo/Round_5_RTC_Oct24/Updated Submitt
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	Hancock
Area (ac)	6.576019
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.1723
Developed Runoff Coefficient (Cd)	0.8345
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	2.4863
Burned Peak Flow Rate (cfs)	2.4863
24-Hr Clear Runoff Volume (ac-ft)	0.4952
24-Hr Clear Runoff Volume (cu-ft)	21570.7998



Peak Flow Hydrologic Analysis

File location: P:/Clients/Newhall_Land/Projects/CWR0782_ES_VCC_Hydrology_2022/VCC/Conformance Memo/Round_5_RTC_Oct24/Updated Submitt
Version: HydroCalc 1.0.3

Input Parameters

Project Name	VCC
Subarea ID	Open Space - Access Road
Area (ac)	9.283138
Flow Path Length (ft)	250.0
Flow Path Slope (vft/hft)	0.05
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.91
Soil Type	20
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.4531
Undeveloped Runoff Coefficient (Cu)	0.1723
Developed Runoff Coefficient (Cd)	0.8345
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	3.5098
Burned Peak Flow Rate (cfs)	3.5098
24-Hr Clear Runoff Volume (ac-ft)	0.6991
24-Hr Clear Runoff Volume (cu-ft)	30450.7501