Appendix B – Hydrologic Parameters & HEC-1 Analyses

- Proposed Condition Standard Form 4
- Proposed Condition HEC-1

TIME OF CONCENTRATION / LAG TIME DETERMINATION - less than 1 mi2

Kimley»Horn

DURANGO & GRAND MONTECITO
ULTIMATE CONDITION

Project No: 090935040
Date: 6/20/24
Calculated by: CK

SUB-BASIN DATA						INITIAL / OVERLAND TIME (Ti)			TRAVEL TIME (Tt)							T_{lag}	REMARKS
Basin ID	DEV./UNDEV. (D or U)	CN	K	AREA Ac	AREA Mi^2	INITIAL LENGTH Feet	SLOPE %	Ti Min	TRAVEL LENGTH Feet	SLOPE %	V_1 VELOCITY FPS	V_2 VELOCITY FPS	Tt Min	Tc Min	Tc Check Min	T_{lag} 0.6Tc/60 Hours	100 YR RAINFALL INCHES
(1)	(2)	(3)	(4)	(5a)	(5b)	(6)	(7)	(8)	(9)	(10)	(10a)	(10b)	(11)	(12)	(13)	(14)	(15)
ON	D	92.0	0.8244	8.80	0.0138	35	1.00	2.9	845	1.20	2.2	3.4	5.5	8.4	14.9	**0.084**	3.00
GMP	D	98.0	0.9036	0.75	0.0012	13	2.30	1.0	344	0.40	1.3	1.9	4.5	5.5	12.0	**0.055**	3.00

NOTE:

(1) Subbasin Name
(2) Developed or Undeveloped Subbasin
(3) Curve Number (See Subbasin CN Calculations)
(4) K = 0.0132 (CN) - 0.39
(5a) & (5b) Area
(6) Initial Length
(7) Initial Slope
(8) Ti = 1.8 (1.1 - K) L^1/2 / S^1/3
(9) Travel Length
(10) Slope
(10a) Slope V_1 applies to the first 500 feet of travel distance;
Developed V_1 = 20.2*(S/100)^1/2
(10b) V_2 applies to the remaining travel distance;
Developed V_2 = 30.6*(S/100)^1/2
(11) Tt = 500/(V1*60)+(Travel Length-500)/(V2*60)
(12) Tc = Ti + Tt
(13) Tc Check = L/180+10 (select smaller Tc)
(14) Tlag = 0.6 Tc/60
(15) Rainfall in inches

REFERENCE: Calculations based on the Clark County Regional Flood Control District HCDDM

STANDARD FORM 4

*Referenced/Revised from Ariva Retail and Office Center Study (PW21-12227)

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1****************************************
 *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
 *               JUN   1998             *
 *            VERSION 4.1               *
 *                                      *
 *  RUN DATE   20JUN24  TIME  13:00:47  *
 *                                      *
 ****************************************
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****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
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```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


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          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

                        *DIAGRAM
 *** FREE ***
             1          ID
             2          ID   ********************************************
             3          ID   *                                          *
             4          ID   *    DURANGO & GRAND MONTECITO             *
             5          ID   *    ULTIMATE CONDITION                    *
             6          ID   *                                          *
             7          ID   *    PROJECT No:_ _ _ 192438000            *
             8          ID   *    FILE: _ _ _ _ _ _ULT.H1               *
             9          ID   *    DATE MODELED:_ _ 04/16/24             *
            10          ID   *    MODELED BY:_ _ _ SS                   *
            11          ID   *                                          *
            12          ID   ********************************************
            13          ID
            14          ID   ********************************************
            15          ID   *    RETURN PERIOD:_ _100- & 10- YEAR      *
            16          ID   *    DISTRIBUTION:_ _ 6-HOUR SDN3          *
            17          ID   ********************************************
            18          ID
                        *DIAGRAM
            19          IT       5       0       0     300
            20          IO       5       0       0
            21          IN       5       0       0
            22          JR    PREC    0.56    1.00
                        *

            23          KK   *DOF3
            24          BA   .0016
            25          PB    3.00
            26          PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
            27          PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
            28          PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
            29          PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
            30          PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
            31          PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
            32          PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
            33          PC    .998    .999    1.00
            34          LS       0    92.0
            35          UD    .053
                        *

            36          KK   *DOF1
            37          BA   .0093
            38          LS       0    92.0
            39          UD    .076
                        *

            40          KK   *DOF4
            41          BA   .0027
            42          LS       0    92.0
            43          UD    .079
                        *
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          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


            44          KK   *DOF5
            45          BA   .0011
            46          LS       0    92.0
            47          UD    .050
                        *

            48          KK    *CP1
            49          KM   COMBINES *DOF3, *DOF1, *DOF4, AND *DOF5
            50          KM   SURFACE FLOW IN GRAND MONTECITO PKWY
            51          HC       4
                        *

            52          KK     GMP
            53          BA   .0012
            54          LS       0    98.0
            55          UD    .055
                        *

            56          KK     CP3
            57          KM   COMBINES *CP1 AND GMP
            58          KM   SURFACE FLOW IN GRAND MONTECITO PKWY
            59          HC       2
                        *

            60          KK   *DOF2
            61          BA   .0066
            62          LS       0    92.0
            63          UD    .092
                        *

            64          KK      ON
            65          BA   .0138
            66          LS       0    92.0
            67          UD    .084
                        *

            68          KK     CP2
            69          KM   COMBINES *DOF2 AND ON
            70          KM   STORM DRAIN FLOW
            71          HC       2
                        *
            72          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING         (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR       (<---) RETURN OF DIVERTED OR PUMPED FLOW

    23       *DOF3
                 .
                 .
    36           .       *DOF1
                 .           .
                 .           .
    40           .           .       *DOF4
                 .           .           .
                 .           .           .
    44           .           .           .       *DOF5
                 .           .           .           .
                 .           .           .           .
    48        *CP1.................................
                 .
                 .
    52           .         GMP
                 .           .
                 .           .
    56         CP3............
                 .
                 .
    60           .       *DOF2
                 .           .
                 .           .
    64           .           .          ON
                 .           .           .
                 .           .           .
    68           .         CP2............

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                                                ****************************************
 *                                       *                                                *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                *    U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998                *                                                *    HYDROLOGIC ENGINEERING CENTER     *
 *          VERSION 4.1                  *                                                *          609 SECOND STREET           *
 *                                       *                                                *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   20JUN24  TIME  13:00:47   *                                                *           (916) 756-1104             *
```

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 *                                        *                                                    *                                       *
 ****************************************                                                      ***************************************




                          *********************************************
                          *                                           *
                          *    DURANGO & GRAND MONTECITO              *
                          *    ULTIMATE CONDITION                     *
                          *                                           *
                          *    PROJECT No:_ _ _ 192438000             *
                          *    FILE: _ _ _ _ _ _ULT.H1                *
                          *    DATE MODELED:_ _ 04/16/24              *
                          *    MODELED BY:_ _ _ SS                    *
                          *                                           *
                          *********************************************

                          *********************************************
                          *    RETURN PERIOD:_ _100- & 10- YEAR       *
                          *    DISTRIBUTION:_ _ 6-HOUR SDN3           *
                          *********************************************


   20 IO         OUTPUT CONTROL VARIABLES
                       IPRNT          5  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

      IT         HYDROGRAPH TIME DATA
                        NMIN          5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1    0  STARTING DATE
                       ITIME       0000  STARTING TIME
                          NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      2    0  ENDING DATE
                      NDTIME       0055  ENDING TIME
                      ICENT          19  CENTURY MARK

                   COMPUTATION INTERVAL     .08 HOURS
                        TOTAL TIME BASE   24.92 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

      JP         MULTI-PLAN OPTION
                       NPLAN          1  NUMBER OF PLANS

      JR         MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                       .56      1.00
1

               PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                 FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                                 TIME TO PEAK IN HOURS


                                                          RATIOS APPLIED TO PRECIPITATION
 OPERATION       STATION     AREA    PLAN           RATIO 1  RATIO 2
                                                        .56     1.00

 HYDROGRAPH AT
+                  *DOF3       .00     1   FLOW          2.       4.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                  *DOF1       .01     1   FLOW          9.      19.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                  *DOF4       .00     1   FLOW          3.       5.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                  *DOF5       .00     1   FLOW          1.       2.
                                           TIME        3.50     3.50

  4 COMBINED AT
+                   *CP1       .01     1   FLOW         14.      30.
                                           TIME        3.50     3.50

 HYDROGRAPH AT
+                    GMP       .00     1   FLOW          2.       3.
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```
                                        TIME         3.50     3.50

  2 COMBINED AT
+                    CP3       .02     1   FLOW          16.      33.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                   *DOF2      .01     1   FLOW           6.      13.
                                           TIME         3.50     3.50

 HYDROGRAPH AT
+                     ON       .01     1   FLOW          13.      27.
                                           TIME         3.50     3.50

  2 COMBINED AT
+                    CP2       .02     1   FLOW          19.      40.
                                           TIME         3.50     3.50


 *** NORMAL END OF HEC-1 ***
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