Preliminary Drainage Study
for
Carefield Senior Care Facility
Bonsall, CA

Prepared for:

Carefield Senior Living
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1. Introduction

This drainage report has been prepared in support of the proposed tentative map for Carefield Senior Care Facility in Bonsall, CA, in conjunction with the project storm water quality management plan (SWQMP) calculations.

2. Project Description

The Carefield Senior Care Facility project is a proposed senior care facility located on a vacant lot at the northeast corner of the intersection of Thoroughbred Lane and Mission Road, in Bonsall, CA (APN 126-230-55-00), in the County of San Diego. The total drainage area of the project is approximately 4.8 acres, with Hydrologic Soil Groups mainly consisting of Type D soils and some Type A soils. These soils are underlain by bedrock, per the soils investigation findings.

Existing Drainage Patterns

The lot is currently undeveloped and vegetated with native shrubs, bushes, and seasonal grasses. The site drains mainly via sheet flow in a southerly direction towards the intersection of Thoroughbred Lane and Mission Road. There is a slight highpoint in Mission Road, located along the subject property's southeast boundary. Approximately one third of the property reaches Mission Road north of the high point and the remaining two thirds drains south of the high point.

Flows reaching the northern side of the high point drain overland, along what remains of old Mission Road. This remaining pavement turns to dirt towards the end of Mission Road, prior to a point at which flows reach a tributary of the San Luis Rey River, approximately 50 feet upstream of this tributary's confluence with the river.

Flows draining south of the Mission Road high point, are accepted by a pair of grated sump inlets on the west side of Mission Road, just north of its intersection with Thoroughbred Lane. These inlets drain via 2 – 22 inch stormdrain lines across mission to a cleanout, then via 1 – 36 inch stormdrain line, directly discharging to the San Luis Rey River across Highway 76.

Proposed Drainage Patterns

The proposed project will drain via sheet flow and onsite stromdrain, generally in the same pattern as in the existing condition. Drainage areas 4, 6C and 9 will drain north, as these areas discharge to Mission Road north of the highpoint discussed previously. All of these areas are self-mitigating and the total area draining north is decreased form the existing condition. Drainage areas 1 and 2 will drain to their respective BMPs for treatment control mitigation, and those BMPs will also provide attenuation, as these drainage areas now include roof and hardscape, resulting in an unmitigated increased peak flow. After draining through the proposed BMPs, flows will drain via new stormdrain to the existing inlets on Mission Road. Remaining onsite self-mitigating areas that drain south of the high point on mission road will bypass the onsite BMPs,

and via new onsite stormdrain, tie in to the stormdrain downstream of the BMPs. Again, draining to the existing inlets on Mission Road.

The project does not propose structures/housing within a 100-year flood hazard area.

3. Hydrology and Detention Routing

Rational Method hydrologic calculations are provided for the developed condition using San Diego County Hydrology Manual (SDCHM) methodology. Calculations are provided with a spreadsheet with SDCHM information as the basis. These results are summarized in Table 1. The hydrology calculations are reflected on the hydrology maps in Appendix C, with corresponding drainage boundaries, initial subareas, and discharge points illustrated. The project site consists of Soil Type D. The land cover consists of rooftop, paved hardscape, and landscaping. C-values were assigned based on the combinations of land cover, paved, and building surfaces.

To mitigate for the increase in 100-year peak flow for developed conditions, a Rational Method hydrograph and detention routing analysis was performed for the post-developed condition. The 100-year, 6-hour Rational Method hydrograph was routed through the biofiltration basins using EPA SWMM. Results are summarized below in Table 2. The routing analysis is provided in Appendix B.

4. Conclusion

The proposed Carefield Senior Living Facility project, as designed, will not substantially alter the existing drainage patterns. Though unmitigated flowrates would increase from pre- to post-project condition, the proposed biofiltration basins will detain peak flow rates to below existing levels; therefore, runoff from the proposed project will not negatively impact downstream storm drain infrastructure. A summary of existing and proposed conditions runoff is provided in Table 1 and Table 2 below. Note also that San Diego County hydrologic and hydraulic requirements/standards are met with the design of all storm drains, inlets, outfalls and ditches.

TABLE 1 – 100-Year Peak Flows (Existing Condition)

Drainage Area	Drainage Area (ac)	T_c	Runoff C	Peak Flow (cfs)
1 (South)	2.9	6	0.35	6.9
2 (North)	1.9	12	0.35	3.0
TOTAL	**4.8**			**9.9**

TABLE 2 – 100-Year Peak Flows (Developed Condition)

Drainage Area	Drainage Area (ac)	Unmitigated Peak Flow (cfs)	Time of Concentration	Runoff Coefficient	Mitigated Peak Flow (cfs)
1	1.83	6.9	8	0.65	6.8 (South)
2	0.43	2.5	6	0.76	
3	0.38	0.5	13	0.35	
4	0.17	0.3	11	0.65	
5a	0.14	0.3	7	0.35	
5b	0.17	0.4	8	0.35	
5c	0.13	0.2	11	0.35	
6a	0.13	0.3	5	0.35	
6b	0.23	0.6	5	0.35	
7	0.28	0.8	5	0.35	
8	0.13	0.3	5	0.35	
10	0.15	0.4	5	0.35	
6c	0.22	0.6	5	0.35	1.4 (North)
9	0.34	0.8	7	0.35	
TOTAL	4.8	14.9			8.2

*Denotes self-treating slope area

REFERENCES

San Diego County, *Hydrology Manual,* June 2013.

DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the Civil Engineer of work for this report, that I have exercised responsible charge of the report as defined in section 6703 of the Business and Professions Code, and that the design is consistent with current design.

I understand that the check of this report by the County does not relieve me, as Engineer of Work, of my responsibilities for project design.

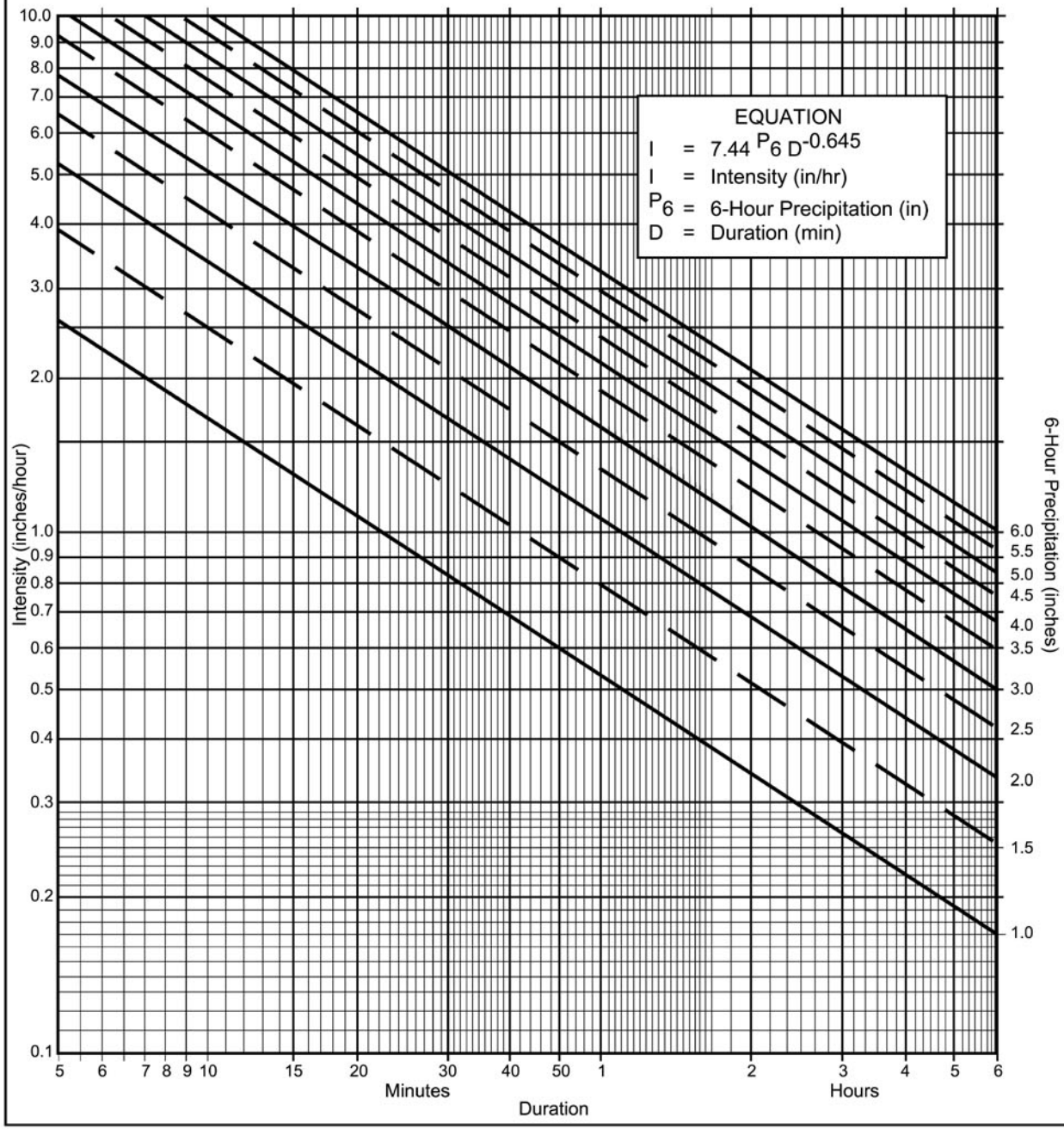
APPENDIX A

Hydrology Manual Figures

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency _____ year

(b) P_6 = _____ in., P_{24} = _____, $\frac{P_6}{P_{24}}$ = _____ %(2)

(c) Adjusted P_6(2) = _____ in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M)
& INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
SD
CHULA VISTA
IMPERIAL BEACH

33°30'
33°15'
33°00'
32°45'
32°30'
117°30'
117°15'
117°00'
116°45'
116°30'
116°15'

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W
E
S

3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
POWAY
S.D. COUNTY
DEL MAR
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
SD
CHULA VISTA
IMPERIAL BEACH

117°30' 117°15' 117°00' 116°45' 116°30' 116°15'
33°30' 33°15' 33°00' 32°45' 32°30'

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
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N W E S

3 0 3 Miles

APPENDIX B

Rational Method Calculations/AES Output

PRE - DEVELOPMENT (DMA-1)

Time of concentration

Initial Sub Area

L :	100	ft
A:	0.220	acres
C:	0.350	
Δz :	18	ft
s:	18	%
ti :	5.15	min
P6 :	3.00	in
I:	7.75	in/hr
Qi :	0.597	cfs

Mannings in triangular channel

Initial velocity

z:	25	
n :	0.035	
so :	0.18	
y :	0.099	ft
Aflow:	0.246	sq-ft
Pflow:	5.0	ft
Q:	0.597	cfs
v :	2.430	ft/s

Final velocity

z:	30	
n :	0.035	(average n)
so :	0.04	
y :	0.307	ft
Aflow:	2.833	sq-ft
Pflow:	18.4	ft
Q:	6.90	cfs
v :	2.435	ft/s

Final Q

Ltravel:	180	ft
vaverage:	2.43	ft/s
tt :	1.23	min
tc:	6.38	min
I :	6.75	in/hr
A :	2.90	acres
C:	0.350	
Q :	6.90	cfs

Time of concentration DMA-1:

6.38 min

6.00 min (rounded)

Total Peak Flow

A :	2.90	acres
C :	0.350	
I :	6.75	in/hr
Q :	6.90	cfs

PRE - DEVELOPMENT (DMA-2)

Time of concentration

Initial Sub Area

L :	100	ft
A:	0.250	acres
C:	0.350	
Δz :	5.3	ft
s:	5.3	%
ti :	7.74	min
P6 :	3.00	in
I:	5.96	in/hr
Qi :	0.522	cfs

Mannings in triangular channel

Initial velocity

z:	40	
n :	0.035	
so :	0.12	
y :	0.085	ft
Aflow:	0.291	sq-ft
Pflow:	6.8	ft
Q:	0.522	cfs
v :	1.795	ft/s

Final velocity

z:	15	
n :	0.035	(average n)
so :	0.014	
y :	0.354	ft
Aflow:	1.878	sq-ft
Pflow:	10.6	ft
Q:	2.97	cfs
v :	1.581	ft/s

Final Q

Ltravel:	410	ft
vaverage:	1.69	ft/s
tt :	4.05	min
tc:	11.79	min
I :	4.54	in/hr
A :	1.86	acres
C:	0.350	
Q :	2.99	cfs

Time of concentration DMA-1:

11.79 min

12.00 min (rounded)

Total Peak Flow

A :	1.861	acres
C :	0.350	
I :	4.54	in/hr
Q :	2.99	cfs

POST - DEVELOPMENT (DMA-1)

Time of concentration

Initial Sub Area

L :	70	ft
A:	0.200	acres
C:	0.650	
Δz :	0.7	ft
s:	1.0	%
ti :	6.78	min
P6 :	3.00	in
I:	6.50	in/hr
Qi :	0.845	cfs

Mannings in triangular channel

Initial velocity

z:	5	
n :	0.016	
so :	0.02	
y :	0.233	ft
Aflow:	0.273	sq-ft
Pflow:	2.4	ft
Q:	0.844	cfs
v :	3.097	ft/s

Final velocity

z:	10	
n :	0.016	(average n)
so :	0.01	
y :	0.450	ft
Aflow:	2.026	sq-ft
Pflow:	9.0	ft
Q:	6.94	cfs
v :	3.425	ft/s

Final Q

Ltravel:	260	ft
vaverage:	3.26	ft/s
tt :	1.33	min
tc:	8.11	min
I :	5.79	in/hr
A :	1.827	acres
C:	0.650	
Q :	6.93	cfs

Time of concentration DMA-1:

8.11 min

8.00 min (rounded)

Total Peak Flow

A :	1.827	acres
C :	0.650	
I :	5.79	in/hr
Q :	6.93	cfs

POST - DEVELOPMENT (DMA-2)

Time of concentration

Initial Sub Area

L :	60	ft
A:	0.100	acres
C:	0.760	
Δz :	0.6	ft
s:	1.0	%
ti :	4.74	min
P6 :	3.00	in
I:	7.90	in/hr
Qi :	0.601	cfs

Mannings in triangular channel

Initial velocity

z:	10	
n :	0.016	
so :	0.02	
y :	0.158	ft
Aflow:	0.250	sq-ft
Pflow:	3.2	ft
Q:	0.602	cfs
v :	2.411	ft/s

Final velocity

z:	10	
n :	0.016	(average n)
so :	0.02	
y :	0.268	ft
Aflow:	0.720	sq-ft
Pflow:	5.4	ft
Q:	2.47	cfs
v :	3.431	ft/s

Final Q

Ltravel:	130	ft
vaverage:	2.92	ft/s
tt :	0.74	min
tc:	5.48	min
I :	7.45	in/hr
A :	0.432	acres
C:	0.760	
Q :	2.47	cfs

Time of concentration DMA-1:

5.48 min

6.00 min (rounded)

Total Peak Flow

A :	0.432	acres
C :	0.760	
I :	7.45	in/hr
Q :	2.47	cfs

POST - DEVELOPMENT (DMA-4)

Time of concentration

Initial Sub Area

L :	50	ft
A:	0.080	acres
C:	0.650	
Δz :	1.0	ft
s:	2.0	%
ti :	4.55	min
P6 :	3.00	in
I:	7.90	in/hr
Qi :	0.411	cfs

Mannings in triangular channel

Initial velocity

z:	25	
n :	0.035	
so :	0.03	
y :	0.121	ft
Aflow:	0.363	sq-ft
Pflow:	6.0	ft
Q:	0.410	cfs
v :	1.130	ft/s

Final velocity

z:	10	
n :	0.035	(average n)
so :	0.04	
y :	0.199	ft
Aflow:	0.396	sq-ft
Pflow:	4.0	ft
Q:	0.72	cfs
v :	1.818	ft/s

Final Q

Ltravel:	213	ft
vaverage:	1.47	ft/s
tt :	2.41	min
tc:	6.95	min
I :	6.39	in/hr
A :	0.172	acres
C:	0.650	
Q :	0.72	cfs

Time of concentration DMA-1:

6.95 min

7.00 min (rounded)

Total Peak Flow

A :	0.172	acres
C :	0.650	
I :	6.39	in/hr
Q :	0.72	cfs

POST - DEVELOPMENT (DMA-5a)

Time of concentration

Initial Sub Area

L :	30	ft
A:	0.040	acres
C:	0.350	
Δz :	0.6	ft
s:	2.0	%
ti :	5.87	min
P6 :	3.00	in
I:	7.13	in/hr
Qi :	0.100	cfs

Mannings in triangular channel

Initial velocity

z:	15	
n :	0.016	
so :	0.08	
y :	0.053	ft
Aflow:	0.043	sq-ft
Pflow:	1.6	ft
Q:	0.100	cfs
v :	2.343	ft/s

Final velocity

z:	15	
n :	0.016	(average n)
so :	0.08	
y :	0.084	ft
Aflow:	0.107	sq-ft
Pflow:	2.5	ft
Q:	0.34	cfs
v :	3.180	ft/s

Final Q

Ltravel:	105	ft
vaverage:	2.76	ft/s
tt :	0.63	min
tc:	6.50	min
I :	6.67	in/hr
A :	0.143	acres
C:	0.350	
Q :	0.34	cfs

Time of concentration DMA-1:

6.50 min

7.00 min (rounded)

Total Peak Flow

A :	0.143	acres
C :	0.350	
I :	6.67	in/hr
Q :	0.34	cfs

POST - DEVELOPMENT (DMA-3)

Time of concentration

Initial Sub Area

L :	50	ft
A:	0.060	acres
C:	0.350	
Δz :	0.5	ft
s:	1.0	%
ti :	9.55	min
P6 :	3.00	in
I:	5.21	in/hr
Qi :	0.109	cfs

Mannings in triangular channel

Initial velocity

z:	30	
n :	0.016	
so :	0.02	
y :	0.055	ft
Aflow:	0.091	sq-ft
Pflow:	3.3	ft
Q:	0.110	cfs
v :	1.199	ft/s

Final velocity

z:	25	
n :	0.016	(average n)
so :	0.03	
y :	0.098	ft
Aflow:	0.241	sq-ft
Pflow:	4.9	ft
Q:	0.52	cfs
v :	2.156	ft/s

Final Q

Ltravel:	320	ft
vaverage:	1.68	ft/s
tt :	3.18	min
tc:	12.72	min
I :	4.33	in/hr
A:	0.342	acres
C:	0.350	
Q :	0.52	cfs

Time of concentration DMA-1:

12.72 min

13.00 min (rounded)

Total Peak Flow

A :	0.342	acres
C :	0.350	
I :	4.33	in/hr
Q :	0.52	cfs

POST - DEVELOPMENT (DMA-5b)

Time of concentration

Initial Sub Area

L :	40	ft
A:	0.050	acres
C:	0.350	
Δz :	1	ft
s:	2.5	%
ti :	6.29	min
P6 :	3.00	in
I:	6.82	in/hr
Qi :	0.119	cfs

Mannings in triangular channel

Initial velocity

z:	25	
n :	0.016	
so :	0.02	
y :	0.061	ft
Aflow:	0.093	sq-ft
Pflow:	3.1	ft
Q:	0.119	cfs
v :	1.282	ft/s

Final velocity

z:	20	
n :	0.016	(average n)
so :	0.005	
y :	0.132	ft
Aflow:	0.346	sq-ft
Pflow:	5.3	ft
Q:	0.37	cfs
v :	1.069	ft/s

Final Q

Ltravel:	115	ft
vaverage:	1.18	ft/s
tt :	1.63	min
tc:	7.92	min
I :	5.87	in/hr
A :	0.174	acres
C:	0.350	
Q :	0.36	cfs

Time of concentration DMA-1:

7.92 min

8.00 min (rounded)

Total Peak Flow

A :	0.174	acres
C :	0.350	
I :	5.87	in/hr
Q :	0.36	cfs

POST - DEVELOPMENT (DMA-5c)

Time of concentration

Initial Sub Area

L :	40	ft
A:	0.040	acres
C:	0.350	
Δz :	1	ft
s:	1.0	%
ti :	8.54	min
P6 :	3.00	in
I:	5.60	in/hr
Qi :	0.078	cfs

Mannings in triangular channel

Initial velocity

z:	25	
n :	0.016	
so :	0.02	
y :	0.016	ft
Aflow:	0.006	sq-ft
Pflow:	0.8	ft
Q:	0.003	cfs
v :	0.521	ft/s

Final velocity

z:	20	
n :	0.016	(average n)
so :	0.01	
y :	0.097	ft
Aflow:	0.187	sq-ft
Pflow:	3.9	ft
Q:	0.23	cfs
v :	1.232	ft/s

Final Q

Ltravel:	115	ft
vaverage:	0.88	ft/s
tt :	2.19	min
tc:	10.73	min
I :	4.83	in/hr
A :	0.134	acres
C:	0.350	
Q :	0.23	cfs

Time of concentration DMA-1:

10.73 min

11.00 min (rounded)

Total Peak Flow

A :	0.134	acres
C :	0.350	
I :	4.83	in/hr
Q :	0.23	cfs

POST - DEVELOPMENT (DMA-6a)

Time of concentration

Initial Sub Area

L :	30	ft
A:	0.050	acres
C:	0.350	
Δz :	6	ft
s:	20.0	%
ti :	2.72	min
P6 :	3.00	in
I:	7.90	in/hr
Qi :	0.138	cfs

Mannings in triangular channel

Initial velocity

z:	3	
n :	0.016	
so :	0.02	
y :	0.145	ft
Aflow:	0.063	sq-ft
Pflow:	0.9	ft
Q:	0.138	cfs
v :	2.202	ft/s

Final velocity

z:	3	
n :	0.016	(average n)
so :	0.01	
y :	0.215	ft
Aflow:	0.138	sq-ft
Pflow:	1.4	ft
Q:	0.28	cfs
v :	2.025	ft/s

Final Q

Ltravel:	225	ft
vaverage:	2.11	ft/s
tt :	1.77	min
tc:	4.50	min
I :	7.90	in/hr
A :	0.101	acres
C:	0.350	
Q :	0.28	cfs

Time of concentration DMA-1:

4.50 min

5.00 min (rounded)

Total Peak Flow

A :	0.101	acres
C :	0.350	
I :	7.90	in/hr
Q :	0.28	cfs

POST - DEVELOPMENT (DMA-6b)

Time of concentration

Initial Sub Area

L :	40	ft
A:	0.050	acres
C:	0.350	
Δz :	20	ft
s:	50.0	%
ti :	2.32	min
P6 :	3.00	in
I:	7.90	in/hr
Qi :	0.138	cfs

Mannings in triangular channel

Initial velocity

z:	3	
n :	0.016	
so :	0.02	
y :	0.145	ft
Aflow:	0.063	sq-ft
Pflow:	0.9	ft
Q:	0.139	cfs
v :	2.204	ft/s

Final velocity

z:	3	
n :	0.016	(average n)
so :	0.02	
y :	0.257	ft
Aflow:	0.198	sq-ft
Pflow:	1.6	ft
Q:	0.64	cfs
v :	3.230	ft/s

Final Q

Ltravel:	180	ft
vaverage:	2.72	ft/s
tt :	1.10	min
tc:	3.42	min
I :	7.90	in/hr
A :	0.229	acres
C:	0.350	
Q :	0.64	cfs

Time of concentration DMA-1:

3.42 min

5.00 min (rounded)

Total Peak Flow

A :	0.229	acres
C :	0.350	
I :	7.90	in/hr
Q :	0.64	cfs

POST - DEVELOPMENT (DMA-6c)

Time of concentration

Initial Sub Area

L :	40	ft
A:	0.050	acres
C:	0.350	
Δz :	20	ft
s:	50.0	%
ti :	2.32	min
P6 :	3.00	in
I:	7.90	in/hr
Qi :	0.138	cfs

Mannings in triangular channel

Initial velocity

z:	3	
n :	0.016	
so :	0.2	
y :	0.094	ft
Aflow:	0.026	sq-ft
Pflow:	0.6	ft
Q:	0.138	cfs
v :	5.219	ft/s

Final velocity

z:	3	
n :	0.016	(average n)
so :	0.03	
y :	0.234	ft
Aflow:	0.164	sq-ft
Pflow:	1.5	ft
Q:	0.61	cfs
v :	3.715	ft/s

Final Q

Ltravel:	240	ft
vaverage:	4.47	ft/s
tt :	0.90	min
tc:	3.21	min
I :	7.90	in/hr
A :	0.217	acres
C:	0.350	
Q :	0.61	cfs

Time of concentration DMA-1:

3.21 min

5.00 min (rounded)

Total Peak Flow

A :	0.217	acres
C :	0.350	
I :	7.90	in/hr
Q :	0.61	cfs

POST - DEVELOPMENT (DMA-7)

Time of concentration

Initial Sub Area

L :	30	ft
A:	0.050	acres
C:	0.350	
Δz :	5	ft
s:	16.0	%
ti :	2.93	min
P6 :	3.00	in
I:	7.90	in/hr
Qi :	0.138	cfs

Mannings in triangular channel

Initial velocity

z:	3	
n :	0.016	
so :	0.02	
y :	0.145	ft
Aflow:	0.063	sq-ft
Pflow:	0.9	ft
Q:	0.139	cfs
v :	2.204	ft/s

Final velocity

z:	3	
n :	0.016	(average n)
so :	0.03	
y :	0.253	ft
Aflow:	0.192	sq-ft
Pflow:	1.6	ft
Q:	0.75	cfs
v :	3.912	ft/s

Final Q

Ltravel:	440	ft
vaverage:	3.06	ft/s
tt :	2.40	min
tc:	5.33	min
I :	7.58	in/hr
A :	0.280	acres
C:	0.350	
Q :	0.75	cfs

Time of concentration DMA-1:

5.33 min

5.00 min (rounded)

Total Peak Flow

A :	0.280	acres
C :	0.350	
I :	7.58	in/hr
Q :	0.75	cfs

POST - DEVELOPMENT (DMA-8)

Time of concentration

Initial Sub Area

L :	20	ft
A:	0.050	acres
C:	0.350	
Δz :	5	ft
s:	25.0	%
ti :	2.06	min
P6 :	3.00	in
I:	7.90	in/hr
Qi :	0.138	cfs

Mannings in triangular channel

Initial velocity

z:	25	
n :	0.016	
so :	0.2	
y :	0.042	ft
Aflow:	0.044	sq-ft
Pflow:	2.1	ft
Q:	0.138	cfs
v :	3.152	ft/s

Final velocity

z:	10	
n :	0.016	(average n)
so :	0.2	
y :	0.076	ft
Aflow:	0.058	sq-ft
Pflow:	1.5	ft
Q:	0.27	cfs
v :	4.679	ft/s

Final Q

Ltravel:	190	ft
vaverage:	3.92	ft/s
tt :	0.81	min
tc:	2.87	min
I :	7.90	in/hr
A :	0.095	acres
C:	0.350	
Q :	0.27	cfs

Time of concentration DMA-1:

2.87 min

5.00 min (rounded)

Total Peak Flow

A :	0.095	acres
C :	0.350	
I :	7.90	in/hr
Q :	0.27	cfs

POST - DEVELOPMENT (DMA-9)

Time of concentration

Initial Sub Area

L :	50	ft
A:	0.080	acres
C:	0.350	
Δz :	4	ft
s:	8.0	%
ti :	4.77	min
P6 :	3.00	in
I:	7.90	in/hr
Qi :	0.221	cfs

Mannings in triangular channel

Initial velocity

z:	3	
n :	0.016	
so :	0.02	
y :	0.172	ft
Aflow:	0.089	sq-ft
Pflow:	1.1	ft
Q:	0.221	cfs
v :	2.474	ft/s

Final velocity

z:	3	
n :	0.016	(average n)
so :	0.08	
y :	0.219	ft
Aflow:	0.145	sq-ft
Pflow:	1.4	ft
Q:	0.84	cfs
v :	5.813	ft/s

Final Q

Ltravel:	320	ft
vaverage:	4.14	ft/s
tt :	1.29	min
tc:	6.06	min
I :	6.98	in/hr
A :	0.340	acres
C:	0.350	
Q :	0.84	cfs

Time of concentration DMA-1:

6.06 min

7.00 min (rounded)

Total Peak Flow

A :	0.340	acres
C :	0.350	
I :	6.98	in/hr
Q :	0.84	cfs

POST - DEVELOPMENT (DMA-10)

Time of concentration

Initial Sub Area

L :	20	ft
A:	0.040	acres
C:	0.350	
Δz :	1	ft
s:	5.0	%
ti :	3.53	min
P6 :	3.00	in
I:	7.90	in/hr
Qi :	0.111	cfs

Mannings in triangular channel

Initial velocity

z:	5	
n :	0.035	
so :	0.2	
y :	0.095	ft
Aflow:	0.045	sq-ft
Pflow:	1.0	ft
Q:	0.112	cfs
v :	2.463	ft/s

Final velocity

z:	5	
n :	0.035	(average n)
so :	0.2	
y :	0.146	ft
Aflow:	0.107	sq-ft
Pflow:	1.5	ft
Q:	0.35	cfs
v :	3.277	ft/s

Final Q

Ltravel:	80	ft
vaverage:	2.87	ft/s
tt :	0.46	min
tc:	4.00	min
I :	7.90	in/hr
A :	0.125	acres
C:	0.350	
Q :	0.35	cfs

Time of concentration DMA-1:

4.00 min

6.00 min (rounded)

Total Peak Flow

A :	0.125	acres
C :	0.350	
I :	7.90	in/hr
Q :	0.35	cfs

APPENDIX C

Detention Routing Analysis

```
[TITLE]
;;Project Title/Notes
Anthony Residence Q100 (Mitigated) - POC-1

[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           01/01/2000
START_TIME           00:00:00
REPORT_START_DATE    01/01/2000
REPORT_START_TIME    00:00:00
END_DATE             01/01/2000
END_TIME             12:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:01:00
DRY_STEP             00:01:00
ROUTING_STEP         0:01:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         12.557
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          0.030  0.050  0.080  0.110  0.130  0.150  0.150  0.130  0.110  0.080  0.040  0.020
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
LID_RAIN         INTENSITY 1:00     1.0      TIMESERIES LID_RAIN

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- ----------------
BMP_1            LID_RAIN         BMP-1            .05037   0        10       0        0
BMP_2            LID_RAIN         BMP-2            .00702   0        10       0        0
```

```
[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
BMP_1            0.012      0.08       0.05       0.10       25         OUTLET
BMP_2            0.012      0.08       0.05       0.10       25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
BMP_1            6          0.075      0.31
BMP_2            7.1        0.054      0.31

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
BMP_1            BC
BMP_1            SURFACE    6          0          0          0          5
BMP_1            SOIL       18         0.4        0.2        0.1        5          5          1.5
BMP_1            STORAGE    15         0.67       0          0
BMP_1            DRAIN      .1013      0.5        3          6

BMP_2            BC
BMP_2            SURFACE    6          0          0          0          5
BMP_2            SOIL       18         0.4        0.2        0.1        5          5          1.5
BMP_2            STORAGE    15         0.67       0          0
BMP_2            DRAIN      .1883      0.5        3          6

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp    ToPerv     RptFile
        DrainTo
;;-------------- ---------------- ------- ---------- ---------- ---------- ---------- ----------
------------------------ ----------------
BMP_1            BMP_1            1       2194.12    0          0          100        0          *
        POC-1
BMP_2            BMP_2            1       305.79     0          0          100        0          *
        POC-1

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
BYPASS_DMA-3     0          0          0          0          0
BYPASS_DMA-5B    0          0          0          0          0
BYPASS_DMA-5C    0          0          0          0          0
BYPASS_DMA-6A    0          0          0          0          0
BYPASS_DMA-6B    0          0          0          0          0
BYPASS_DMA-7     0          0          0          0          0
BYPASS_DMA-8     0          0          0          0          0
BYPASS_DMA-5A    0          0          0          0          0
BYPASS_DMA-10    0          0          0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
DMA_1            0          FREE                        NO       BMP_1
DMA_2            0          FREE                        NO       BMP_2
POC-1            0          FREE                        NO
```

DMA_4 0 FREE NO BMP_2

[STORAGE]

;;Name	Elev.	MaxDepth	InitDepth	Shape	Curve Name/Params	N/A	Fevap	Psi	Ksat	IMD
BMP-1	0	2	0	TABULAR	BMP_1	0	1			
BMP-2	0	2	0	TABULAR	BMP-2	0	1			

[CONDUITS]

;;Name	From Node	To Node	Length	Roughness	InOffset	OutOffset	InitFlow	MaxFlow
DUMMY_3	BYPASS_DMA-3	POC-1	400	0.01	0	0	0	0
DUMMY_5B	BYPASS_DMA-5B	POC-1	400	0.01	0	0	0	0
DUMMY_5C	BYPASS_DMA-5C	POC-1	400	0.01	0	0	0	0
DUMMY_6A	BYPASS_DMA-6A	POC-1	400	0.01	0	0	0	0
DUMMY_6B	BYPASS_DMA-6B	POC-1	400	0.01	0	0	0	0
DUMMY_7	BYPASS_DMA-7	POC-1	400	0.01	0	0	0	0
DUMMY_5A	BYPASS_DMA-5A	POC-1	400	0.01	0	0	0	0
DUMMY_8	BYPASS_DMA-8	POC-1	400	0.01	0	0	0	0
DUMMY_10	BYPASS_DMA-10	POC-1	400	0.01	0	0	0	0

[OUTLETS]

;;Name	From Node	To Node	Offset	Type	QTable/Qcoeff	Qexpon	Gated
OUT_1	BMP-1	POC-1	0	TABULAR/DEPTH	OUT_1		NO
OUT_2	BMP-2	POC-1	0	TABULAR/DEPTH	OUT_2		NO

[XSECTIONS]

;;Link	Shape	Geom1	Geom2	Geom3	Geom4	Barrels	Culvert
DUMMY_3	DUMMY	0	0	0	0	1	
DUMMY_5B	DUMMY	0	0	0	0	1	
DUMMY_5C	DUMMY	0	0	0	0	1	
DUMMY_6A	DUMMY	0	0	0	0	1	
DUMMY_6B	DUMMY	0	0	0	0	1	
DUMMY_7	DUMMY	0	0	0	0	1	
DUMMY_5A	DUMMY	0	0	0	0	1	
DUMMY_8	DUMMY	0	0	0	0	1	
DUMMY_10	DUMMY	0	0	0	0	1	

[INFLOWS]

;;Node	Constituent	Time Series	Type	Mfactor	Sfactor	Baseline	Pattern
BYPASS_DMA-3	FLOW	DMA-3_HYDRO	FLOW	1.0	1.0		
BYPASS_DMA-5B	FLOW	DMA-5B_HYDRO	FLOW	1.0	1.0		
BYPASS_DMA-5C	FLOW	DMA-5C_HYDRO	FLOW	1.0	1.0		
BYPASS_DMA-6A	FLOW	DMA-6A_HYDRO	FLOW	1.0	1.0		
BYPASS_DMA-6B	FLOW	DMA-6B_HYDRO	FLOW	1.0	1.0		
BYPASS_DMA-7	FLOW	DMA-7_HYDRO	FLOW	1.0	1.0		
BYPASS_DMA-8	FLOW	DMA-8_HYDRO	FLOW	1.0	1.0		
BYPASS_DMA-5A	FLOW	DMA-5A_HYDRO	FLOW	1.0	1.0		
BYPASS_DMA-10	FLOW	DMA-10_HYDRO	FLOW	1.0	1.0		
DMA_1	FLOW	DMA_1_HYDRO	FLOW	1.0	1.0		
DMA_2	FLOW	DMA_2_HYDRO	FLOW	1.0	1.0		
POC-1	FLOW	DMA-3_HYDRO	FLOW	1.0	1.0		
DMA_4	FLOW	DMA_2_HYDRO	FLOW	1.0	1.0		

[CURVES]

;;Name	Type	X-Value	Y-Value
OUT_1	Rating	0.000	0.000
OUT_1		0.042	0.010
OUT_1		0.083	0.039
OUT_1		0.125	0.086
OUT_1		0.167	0.148
OUT_1		0.208	0.222
OUT_1		0.250	0.308
OUT_1		0.292	0.401
OUT_1		0.333	0.500
OUT_1		0.375	0.595
OUT_1		0.417	0.651
OUT_1		0.458	0.703
OUT_1		0.500	0.752
OUT_1		0.542	0.877
OUT_1		0.583	1.065
OUT_1		0.625	1.293
OUT_1		0.667	1.554
OUT_1		0.708	1.824
OUT_1		0.750	1.994
OUT_1		0.792	2.147
OUT_1		0.833	2.287
OUT_1		0.875	2.418
OUT_1		0.917	2.541
OUT_1		0.958	2.658
OUT_1		1.000	2.769
OUT_1		1.042	2.875
OUT_1		1.083	2.978
OUT_1		1.125	3.077
OUT_1		1.167	3.172
OUT_1		1.208	3.264
OUT_1		1.250	3.354
OUT_1		1.292	3.442
OUT_1		1.333	3.527
OUT_1		1.375	3.610
OUT_1		1.417	3.691
OUT_1		1.458	3.770
OUT_1		1.500	3.847

```
OUT_1                      1.542      4.240
OUT_1                      1.583      4.893
OUT_1                      1.625      5.715
OUT_1                      1.667      6.674
OUT_1                      1.708      7.751
OUT_1                      1.750      8.933
OUT_1                      1.792      10.211
OUT_1                      1.833      11.577
OUT_1                      1.875      13.027
OUT_1                      1.917      14.555
OUT_1                      1.958      16.157
OUT_1                      2.000      17.829
;
OUT_2            Rating    0.000      0.000
OUT_2                      0.042      0.007
OUT_2                      0.083      0.026
OUT_2                      0.125      0.054
OUT_2                      0.167      0.088
OUT_2                      0.208      0.115
OUT_2                      0.250      0.133
OUT_2                      0.292      0.149
OUT_2                      0.333      0.163
OUT_2                      0.375      0.176
OUT_2                      0.417      0.188
OUT_2                      0.458      0.199
OUT_2                      0.500      0.210
OUT_2                      0.542      0.260
OUT_2                      0.583      0.342
OUT_2                      0.625      0.445
OUT_2                      0.667      0.565
OUT_2                      0.708      0.690
OUT_2                      0.750      0.766
OUT_2                      0.792      0.833
OUT_2                      0.833      0.894
OUT_2                      0.875      0.951
OUT_2                      0.917      1.004
OUT_2                      0.958      1.054
OUT_2                      1.000      1.102
OUT_2                      1.042      1.147
OUT_2                      1.083      1.191
OUT_2                      1.125      1.233
OUT_2                      1.167      1.274
OUT_2                      1.208      1.313
OUT_2                      1.250      1.351
OUT_2                      1.292      1.704
OUT_2                      1.333      2.319
OUT_2                      1.375      3.103
OUT_2                      1.417      4.024
OUT_2                      1.458      5.064
OUT_2                      1.500      6.209
OUT_2                      1.542      7.451
OUT_2                      1.583      8.782
OUT_2                      1.625      10.196
OUT_2                      1.667      11.689
OUT_2                      1.708      13.256
OUT_2                      1.750      14.894
OUT_2                      1.792      16.601
```

```
OUT_2                          1.833      18.373
OUT_2                          1.875      20.207
OUT_2                          1.917      22.103
OUT_2                          1.958      24.058
OUT_2                          2.000      26.070
;
BMP_1            Storage       0          2194
BMP_1                          2          2194
;
BMP-2            Storage       0.00       306
BMP-2                          0.08       336
BMP-2                          0.17       365
BMP-2                          0.25       395
BMP-2                          0.33       425
BMP-2                          0.42       454
BMP-2                          0.50       484
BMP-2                          0.58       514
BMP-2                          0.67       543
BMP-2                          0.75       573
BMP-2                          0.83       603
BMP-2                          0.92       632
BMP-2                          1.00       662
BMP-2                          1.08       697
BMP-2                          1.17       731
BMP-2                          1.25       766
BMP-2                          1.33       800
BMP-2                          1.42       835
BMP-2                          1.50       870
BMP-2                          1.58       904
BMP-2                          1.67       939
BMP-2                          1.75       973
BMP-2                          1.83       1008
BMP-2                          1.92       1042
BMP-2                          2.00       1077

[TIMESERIES]
;;Name            Date       Time       Value
;;--------------- ---------- ---------- ----------
DMA_1_HYDRO                    0:00       0
DMA_1_HYDRO                    0:08       0.21
DMA_1_HYDRO                    0:16       0.22
DMA_1_HYDRO                    0:24       0.22
DMA_1_HYDRO                    0:32       0.23
DMA_1_HYDRO                    0:40       0.23
DMA_1_HYDRO                    0:48       0.24
DMA_1_HYDRO                    0:56       0.25
DMA_1_HYDRO                    1:04       0.25
DMA_1_HYDRO                    1:12       0.26
DMA_1_HYDRO                    1:20       0.27
DMA_1_HYDRO                    1:28       0.28
DMA_1_HYDRO                    1:36       0.28
DMA_1_HYDRO                    1:44       0.30
DMA_1_HYDRO                    1:52       0.30
DMA_1_HYDRO                    2:00       0.32
DMA_1_HYDRO                    2:08       0.33
DMA_1_HYDRO                    2:16       0.35
DMA_1_HYDRO                    2:24       0.36
```

```
DMA_1_HYDRO              2:32       0.39
DMA_1_HYDRO              2:40       0.40
DMA_1_HYDRO              2:48       0.44
DMA_1_HYDRO              2:56       0.46
DMA_1_HYDRO              3:04       0.51
DMA_1_HYDRO              3:12       0.54
DMA_1_HYDRO              3:20       0.62
DMA_1_HYDRO              3:28       0.67
DMA_1_HYDRO              3:36       0.82
DMA_1_HYDRO              3:44       0.93
DMA_1_HYDRO              3:52       1.37
DMA_1_HYDRO              4:00       1.93
DMA_1_HYDRO              4:08       6.93
DMA_1_HYDRO              4:16       1.10
DMA_1_HYDRO              4:24       0.74
DMA_1_HYDRO              4:32       0.58
DMA_1_HYDRO              4:40       0.48
DMA_1_HYDRO              4:48       0.42
DMA_1_HYDRO              4:56       0.37
DMA_1_HYDRO              5:04       0.34
DMA_1_HYDRO              5:12       0.31
DMA_1_HYDRO              5:20       0.29
DMA_1_HYDRO              5:28       0.27
DMA_1_HYDRO              5:36       0.26
DMA_1_HYDRO              5:44       0.24
DMA_1_HYDRO              5:52       0.23
DMA_1_HYDRO              6:00       0.22
;
DMA_2_HYDRO              0:00       0
DMA_2_HYDRO              0:06       0.06
DMA_2_HYDRO              0:12       0.06
DMA_2_HYDRO              0:18       0.06
DMA_2_HYDRO              0:24       0.06
DMA_2_HYDRO              0:30       0.06
DMA_2_HYDRO              0:36       0.06
DMA_2_HYDRO              0:42       0.07
DMA_2_HYDRO              0:48       0.07
DMA_2_HYDRO              0:54       0.07
DMA_2_HYDRO              1:00       0.07
DMA_2_HYDRO              1:06       0.07
DMA_2_HYDRO              1:12       0.07
DMA_2_HYDRO              1:18       0.07
DMA_2_HYDRO              1:24       0.08
DMA_2_HYDRO              1:30       0.08
DMA_2_HYDRO              1:36       0.08
DMA_2_HYDRO              1:42       0.08
DMA_2_HYDRO              1:48       0.08
DMA_2_HYDRO              1:54       0.09
DMA_2_HYDRO              2:00       0.09
DMA_2_HYDRO              2:06       0.09
DMA_2_HYDRO              2:12       0.09
DMA_2_HYDRO              2:18       0.10
DMA_2_HYDRO              2:24       0.10
DMA_2_HYDRO              2:30       0.11
DMA_2_HYDRO              2:36       0.11
DMA_2_HYDRO              2:42       0.12
DMA_2_HYDRO              2:48       0.12
```

```
DMA_2_HYDRO              2:54       0.13
DMA_2_HYDRO              3:00       0.13
DMA_2_HYDRO              3:06       0.15
DMA_2_HYDRO              3:12       0.15
DMA_2_HYDRO              3:18       0.17
DMA_2_HYDRO              3:24       0.18
DMA_2_HYDRO              3:30       0.21
DMA_2_HYDRO              3:36       0.22
DMA_2_HYDRO              3:42       0.27
DMA_2_HYDRO              3:48       0.31
DMA_2_HYDRO              3:54       0.46
DMA_2_HYDRO              4:00       0.64
DMA_2_HYDRO              4:06       2.47
DMA_2_HYDRO              4:12       0.37
DMA_2_HYDRO              4:18       0.25
DMA_2_HYDRO              4:24       0.19
DMA_2_HYDRO              4:30       0.16
DMA_2_HYDRO              4:36       0.14
DMA_2_HYDRO              4:42       0.12
DMA_2_HYDRO              4:48       0.11
DMA_2_HYDRO              4:54       0.10
DMA_2_HYDRO              5:00       0.10
DMA_2_HYDRO              5:06       0.09
DMA_2_HYDRO              5:12       0.09
DMA_2_HYDRO              5:18       0.08
DMA_2_HYDRO              5:24       0.08
DMA_2_HYDRO              5:30       0.07
DMA_2_HYDRO              5:36       0.07
DMA_2_HYDRO              5:42       0.07
DMA_2_HYDRO              5:48       0.06
DMA_2_HYDRO              5:54       0.06
DMA_2_HYDRO              6:00       0.06
;
DMA-3_HYDRO              0:00       0
DMA-3_HYDRO              0:13       0.02
DMA-3_HYDRO              0:26       0.02
DMA-3_HYDRO              0:39       0.02
DMA-3_HYDRO              0:52       0.02
DMA-3_HYDRO              1:05       0.03
DMA-3_HYDRO              1:18       0.03
DMA-3_HYDRO              1:31       0.03
DMA-3_HYDRO              1:44       0.03
DMA-3_HYDRO              1:57       0.03
DMA-3_HYDRO              2:10       0.03
DMA-3_HYDRO              2:23       0.04
DMA-3_HYDRO              2:36       0.04
DMA-3_HYDRO              2:49       0.05
DMA-3_HYDRO              3:02       0.05
DMA-3_HYDRO              3:15       0.06
DMA-3_HYDRO              3:28       0.07
DMA-3_HYDRO              3:41       0.10
DMA-3_HYDRO              3:54       0.14
DMA-3_HYDRO              4:07       0.52
DMA-3_HYDRO              4:20       0.08
DMA-3_HYDRO              4:33       0.05
DMA-3_HYDRO              4:46       0.04
DMA-3_HYDRO              4:59       0.04
```

```
DMA-3_HYDRO              5:12       0.03
DMA-3_HYDRO              5:25       0.03
DMA-3_HYDRO              5:38       0.03
DMA-3_HYDRO              5:51       0.02
DMA-3_HYDRO              6:04       0.02
;
DMA-5A_HYDRO             0:00       0
DMA-5A_HYDRO             0:07       0.01
DMA-5A_HYDRO             0:14       0.01
DMA-5A_HYDRO             0:21       0.01
DMA-5A_HYDRO             0:28       0.01
DMA-5A_HYDRO             0:35       0.01
DMA-5A_HYDRO             0:42       0.01
DMA-5A_HYDRO             0:49       0.01
DMA-5A_HYDRO             0:56       0.01
DMA-5A_HYDRO             1:03       0.01
DMA-5A_HYDRO             1:10       0.01
DMA-5A_HYDRO             1:17       0.01
DMA-5A_HYDRO             1:24       0.01
DMA-5A_HYDRO             1:31       0.01
DMA-5A_HYDRO             1:38       0.01
DMA-5A_HYDRO             1:45       0.01
DMA-5A_HYDRO             1:52       0.01
DMA-5A_HYDRO             1:59       0.01
DMA-5A_HYDRO             2:06       0.01
DMA-5A_HYDRO             2:13       0.01
DMA-5A_HYDRO             2:20       0.02
DMA-5A_HYDRO             2:27       0.02
DMA-5A_HYDRO             2:34       0.02
DMA-5A_HYDRO             2:41       0.02
DMA-5A_HYDRO             2:48       0.02
DMA-5A_HYDRO             2:55       0.02
DMA-5A_HYDRO             3:02       0.02
DMA-5A_HYDRO             3:09       0.02
DMA-5A_HYDRO             3:16       0.02
DMA-5A_HYDRO             3:23       0.03
DMA-5A_HYDRO             3:30       0.03
DMA-5A_HYDRO             3:37       0.04
DMA-5A_HYDRO             3:44       0.04
DMA-5A_HYDRO             3:51       0.06
DMA-5A_HYDRO             3:58       0.09
DMA-5A_HYDRO             4:05       0.34
DMA-5A_HYDRO             4:12       0.05
DMA-5A_HYDRO             4:19       0.03
DMA-5A_HYDRO             4:26       0.03
DMA-5A_HYDRO             4:33       0.02
DMA-5A_HYDRO             4:40       0.02
DMA-5A_HYDRO             4:47       0.02
DMA-5A_HYDRO             4:54       0.02
DMA-5A_HYDRO             5:01       0.01
DMA-5A_HYDRO             5:08       0.01
DMA-5A_HYDRO             5:15       0.01
DMA-5A_HYDRO             5:22       0.01
DMA-5A_HYDRO             5:29       0.01
DMA-5A_HYDRO             5:36       0.01
DMA-5A_HYDRO             5:43       0.01
DMA-5A_HYDRO             5:50       0.01
```

```
DMA-5A_HYDRO             5:57       0.01
DMA-5A_HYDRO             6:04       0.01
;
DMA-5B_HYDRO             0:00       0
DMA-5B_HYDRO             0:08       0.01
DMA-5B_HYDRO             0:16       0.01
DMA-5B_HYDRO             0:24       0.01
DMA-5B_HYDRO             0:32       0.01
DMA-5B_HYDRO             0:40       0.01
DMA-5B_HYDRO             0:48       0.01
DMA-5B_HYDRO             0:56       0.01
DMA-5B_HYDRO             1:04       0.01
DMA-5B_HYDRO             1:12       0.01
DMA-5B_HYDRO             1:20       0.01
DMA-5B_HYDRO             1:28       0.01
DMA-5B_HYDRO             1:36       0.01
DMA-5B_HYDRO             1:44       0.02
DMA-5B_HYDRO             1:52       0.02
DMA-5B_HYDRO             2:00       0.02
DMA-5B_HYDRO             2:08       0.02
DMA-5B_HYDRO             2:16       0.02
DMA-5B_HYDRO             2:24       0.02
DMA-5B_HYDRO             2:32       0.02
DMA-5B_HYDRO             2:40       0.02
DMA-5B_HYDRO             2:48       0.02
DMA-5B_HYDRO             2:56       0.02
DMA-5B_HYDRO             3:04       0.03
DMA-5B_HYDRO             3:12       0.03
DMA-5B_HYDRO             3:20       0.03
DMA-5B_HYDRO             3:28       0.03
DMA-5B_HYDRO             3:36       0.04
DMA-5B_HYDRO             3:44       0.05
DMA-5B_HYDRO             3:52       0.07
DMA-5B_HYDRO             4:00       0.10
DMA-5B_HYDRO             4:08       0.36
DMA-5B_HYDRO             4:16       0.06
DMA-5B_HYDRO             4:24       0.04
DMA-5B_HYDRO             4:32       0.03
DMA-5B_HYDRO             4:40       0.02
DMA-5B_HYDRO             4:48       0.02
DMA-5B_HYDRO             4:56       0.02
DMA-5B_HYDRO             5:04       0.02
DMA-5B_HYDRO             5:12       0.02
DMA-5B_HYDRO             5:20       0.01
DMA-5B_HYDRO             5:28       0.01
DMA-5B_HYDRO             5:36       0.01
DMA-5B_HYDRO             5:44       0.01
DMA-5B_HYDRO             5:52       0.01
DMA-5B_HYDRO             6:00       0.01
;
DMA-5C_HYDRO             0:00       0
DMA-5C_HYDRO             0:11       0.01
DMA-5C_HYDRO             0:22       0.01
DMA-5C_HYDRO             0:33       0.01
DMA-5C_HYDRO             0:44       0.01
DMA-5C_HYDRO             0:55       0.01
DMA-5C_HYDRO             1:06       0.01
```

```
DMA-5C_HYDRO             1:17       0.01
DMA-5C_HYDRO             1:28       0.01
DMA-5C_HYDRO             1:39       0.01
DMA-5C_HYDRO             1:50       0.01
DMA-5C_HYDRO             2:01       0.01
DMA-5C_HYDRO             2:12       0.01
DMA-5C_HYDRO             2:23       0.01
DMA-5C_HYDRO             2:34       0.02
DMA-5C_HYDRO             2:45       0.02
DMA-5C_HYDRO             2:56       0.02
DMA-5C_HYDRO             3:07       0.02
DMA-5C_HYDRO             3:18       0.03
DMA-5C_HYDRO             3:29       0.03
DMA-5C_HYDRO             3:40       0.04
DMA-5C_HYDRO             3:51       0.06
DMA-5C_HYDRO             4:02       0.23
DMA-5C_HYDRO             4:13       0.04
DMA-5C_HYDRO             4:24       0.02
DMA-5C_HYDRO             4:35       0.02
DMA-5C_HYDRO             4:46       0.02
DMA-5C_HYDRO             4:57       0.01
DMA-5C_HYDRO             5:08       0.01
DMA-5C_HYDRO             5:19       0.01
DMA-5C_HYDRO             5:30       0.01
DMA-5C_HYDRO             5:41       0.01
DMA-5C_HYDRO             5:52       0.01
DMA-5C_HYDRO             6:03       0.00
;
DMA-6A_HYDRO             0:00       0
DMA-6A_HYDRO             0:05       0.01
DMA-6A_HYDRO             0:10       0.01
DMA-6A_HYDRO             0:15       0.01
DMA-6A_HYDRO             0:20       0.01
DMA-6A_HYDRO             0:25       0.01
DMA-6A_HYDRO             0:30       0.01
DMA-6A_HYDRO             0:35       0.01
DMA-6A_HYDRO             0:40       0.01
DMA-6A_HYDRO             0:45       0.01
DMA-6A_HYDRO             0:50       0.01
DMA-6A_HYDRO             0:55       0.01
DMA-6A_HYDRO             1:00       0.01
DMA-6A_HYDRO             1:05       0.01
DMA-6A_HYDRO             1:10       0.01
DMA-6A_HYDRO             1:15       0.01
DMA-6A_HYDRO             1:20       0.01
DMA-6A_HYDRO             1:25       0.01
DMA-6A_HYDRO             1:30       0.01
DMA-6A_HYDRO             1:35       0.01
DMA-6A_HYDRO             1:40       0.01
DMA-6A_HYDRO             1:45       0.01
DMA-6A_HYDRO             1:50       0.01
DMA-6A_HYDRO             1:55       0.01
DMA-6A_HYDRO             2:00       0.01
DMA-6A_HYDRO             2:05       0.01
DMA-6A_HYDRO             2:10       0.01
DMA-6A_HYDRO             2:15       0.01
DMA-6A_HYDRO             2:20       0.01
```

```
DMA-6A_HYDRO            2:25       0.01
DMA-6A_HYDRO            2:30       0.01
DMA-6A_HYDRO            2:35       0.01
DMA-6A_HYDRO            2:40       0.01
DMA-6A_HYDRO            2:45       0.01
DMA-6A_HYDRO            2:50       0.01
DMA-6A_HYDRO            2:55       0.01
DMA-6A_HYDRO            3:00       0.01
DMA-6A_HYDRO            3:05       0.02
DMA-6A_HYDRO            3:10       0.02
DMA-6A_HYDRO            3:15       0.02
DMA-6A_HYDRO            3:20       0.02
DMA-6A_HYDRO            3:25       0.02
DMA-6A_HYDRO            3:30       0.02
DMA-6A_HYDRO            3:35       0.02
DMA-6A_HYDRO            3:40       0.03
DMA-6A_HYDRO            3:45       0.03
DMA-6A_HYDRO            3:50       0.04
DMA-6A_HYDRO            3:55       0.06
DMA-6A_HYDRO            4:00       0.08
DMA-6A_HYDRO            4:05       0.28
DMA-6A_HYDRO            4:10       0.04
DMA-6A_HYDRO            4:15       0.03
DMA-6A_HYDRO            4:20       0.02
DMA-6A_HYDRO            4:25       0.02
DMA-6A_HYDRO            4:30       0.02
DMA-6A_HYDRO            4:35       0.02
DMA-6A_HYDRO            4:40       0.01
DMA-6A_HYDRO            4:45       0.01
DMA-6A_HYDRO            4:50       0.01
DMA-6A_HYDRO            4:55       0.01
DMA-6A_HYDRO            5:00       0.01
DMA-6A_HYDRO            5:05       0.01
DMA-6A_HYDRO            5:10       0.01
DMA-6A_HYDRO            5:15       0.01
DMA-6A_HYDRO            5:20       0.01
DMA-6A_HYDRO            5:25       0.01
DMA-6A_HYDRO            5:30       0.01
DMA-6A_HYDRO            5:35       0.01
DMA-6A_HYDRO            5:40       0.01
DMA-6A_HYDRO            5:45       0.01
DMA-6A_HYDRO            5:50       0.01
DMA-6A_HYDRO            5:55       0.01
DMA-6A_HYDRO            6:00       0.01
;
DMA-6B_HYDRO            0:00       0
DMA-6B_HYDRO            0:05       0.01
DMA-6B_HYDRO            0:10       0.01
DMA-6B_HYDRO            0:15       0.01
DMA-6B_HYDRO            0:20       0.01
DMA-6B_HYDRO            0:25       0.02
DMA-6B_HYDRO            0:30       0.02
DMA-6B_HYDRO            0:35       0.02
DMA-6B_HYDRO            0:40       0.02
DMA-6B_HYDRO            0:45       0.02
DMA-6B_HYDRO            0:50       0.02
DMA-6B_HYDRO            0:55       0.02
```

DMA-6B_HYDRO	1:00	0.02
DMA-6B_HYDRO	1:05	0.02
DMA-6B_HYDRO	1:10	0.02
DMA-6B_HYDRO	1:15	0.02
DMA-6B_HYDRO	1:20	0.02
DMA-6B_HYDRO	1:25	0.02
DMA-6B_HYDRO	1:30	0.02
DMA-6B_HYDRO	1:35	0.02
DMA-6B_HYDRO	1:40	0.02
DMA-6B_HYDRO	1:45	0.02
DMA-6B_HYDRO	1:50	0.02
DMA-6B_HYDRO	1:55	0.02
DMA-6B_HYDRO	2:00	0.02
DMA-6B_HYDRO	2:05	0.02
DMA-6B_HYDRO	2:10	0.02
DMA-6B_HYDRO	2:15	0.02
DMA-6B_HYDRO	2:20	0.02
DMA-6B_HYDRO	2:25	0.03
DMA-6B_HYDRO	2:30	0.03
DMA-6B_HYDRO	2:35	0.03
DMA-6B_HYDRO	2:40	0.03
DMA-6B_HYDRO	2:45	0.03
DMA-6B_HYDRO	2:50	0.03
DMA-6B_HYDRO	2:55	0.03
DMA-6B_HYDRO	3:00	0.03
DMA-6B_HYDRO	3:05	0.04
DMA-6B_HYDRO	3:10	0.04
DMA-6B_HYDRO	3:15	0.04
DMA-6B_HYDRO	3:20	0.04
DMA-6B_HYDRO	3:25	0.05
DMA-6B_HYDRO	3:30	0.05
DMA-6B_HYDRO	3:35	0.06
DMA-6B_HYDRO	3:40	0.06
DMA-6B_HYDRO	3:45	0.08
DMA-6B_HYDRO	3:50	0.09
DMA-6B_HYDRO	3:55	0.13
DMA-6B_HYDRO	4:00	0.18
DMA-6B_HYDRO	4:05	0.64
DMA-6B_HYDRO	4:10	0.10
DMA-6B_HYDRO	4:15	0.07
DMA-6B_HYDRO	4:20	0.05
DMA-6B_HYDRO	4:25	0.04
DMA-6B_HYDRO	4:30	0.04
DMA-6B_HYDRO	4:35	0.03
DMA-6B_HYDRO	4:40	0.03
DMA-6B_HYDRO	4:45	0.03
DMA-6B_HYDRO	4:50	0.03
DMA-6B_HYDRO	4:55	0.02
DMA-6B_HYDRO	5:00	0.02
DMA-6B_HYDRO	5:05	0.02
DMA-6B_HYDRO	5:10	0.02
DMA-6B_HYDRO	5:15	0.02
DMA-6B_HYDRO	5:20	0.02
DMA-6B_HYDRO	5:25	0.02
DMA-6B_HYDRO	5:30	0.02
DMA-6B_HYDRO	5:35	0.02
DMA-6B_HYDRO	5:40	0.02

```
DMA-6B_HYDRO            5:45       0.02
DMA-6B_HYDRO            5:50       0.02
DMA-6B_HYDRO            5:55       0.02
DMA-6B_HYDRO            6:00       0.01
;
DMA-7_HYDRO             0:00       0
DMA-7_HYDRO             0:05       0.02
DMA-7_HYDRO             0:10       0.02
DMA-7_HYDRO             0:15       0.02
DMA-7_HYDRO             0:20       0.02
DMA-7_HYDRO             0:25       0.02
DMA-7_HYDRO             0:30       0.02
DMA-7_HYDRO             0:35       0.02
DMA-7_HYDRO             0:40       0.02
DMA-7_HYDRO             0:45       0.02
DMA-7_HYDRO             0:50       0.02
DMA-7_HYDRO             0:55       0.02
DMA-7_HYDRO             1:00       0.02
DMA-7_HYDRO             1:05       0.02
DMA-7_HYDRO             1:10       0.02
DMA-7_HYDRO             1:15       0.02
DMA-7_HYDRO             1:20       0.02
DMA-7_HYDRO             1:25       0.02
DMA-7_HYDRO             1:30       0.02
DMA-7_HYDRO             1:35       0.02
DMA-7_HYDRO             1:40       0.02
DMA-7_HYDRO             1:45       0.02
DMA-7_HYDRO             1:50       0.03
DMA-7_HYDRO             1:55       0.03
DMA-7_HYDRO             2:00       0.03
DMA-7_HYDRO             2:05       0.03
DMA-7_HYDRO             2:10       0.03
DMA-7_HYDRO             2:15       0.03
DMA-7_HYDRO             2:20       0.03
DMA-7_HYDRO             2:25       0.03
DMA-7_HYDRO             2:30       0.03
DMA-7_HYDRO             2:35       0.03
DMA-7_HYDRO             2:40       0.03
DMA-7_HYDRO             2:45       0.04
DMA-7_HYDRO             2:50       0.04
DMA-7_HYDRO             2:55       0.04
DMA-7_HYDRO             3:00       0.04
DMA-7_HYDRO             3:05       0.04
DMA-7_HYDRO             3:10       0.05
DMA-7_HYDRO             3:15       0.05
DMA-7_HYDRO             3:20       0.05
DMA-7_HYDRO             3:25       0.06
DMA-7_HYDRO             3:30       0.06
DMA-7_HYDRO             3:35       0.07
DMA-7_HYDRO             3:40       0.08
DMA-7_HYDRO             3:45       0.09
DMA-7_HYDRO             3:50       0.10
DMA-7_HYDRO             3:55       0.15
DMA-7_HYDRO             4:00       0.22
DMA-7_HYDRO             4:05       0.75
DMA-7_HYDRO             4:10       0.12
DMA-7_HYDRO             4:15       0.08
```

```
DMA-7_HYDRO             4:20       0.06
DMA-7_HYDRO             4:25       0.05
DMA-7_HYDRO             4:30       0.05
DMA-7_HYDRO             4:35       0.04
DMA-7_HYDRO             4:40       0.04
DMA-7_HYDRO             4:45       0.03
DMA-7_HYDRO             4:50       0.03
DMA-7_HYDRO             4:55       0.03
DMA-7_HYDRO             5:00       0.03
DMA-7_HYDRO             5:05       0.03
DMA-7_HYDRO             5:10       0.03
DMA-7_HYDRO             5:15       0.02
DMA-7_HYDRO             5:20       0.02
DMA-7_HYDRO             5:25       0.02
DMA-7_HYDRO             5:30       0.02
DMA-7_HYDRO             5:35       0.02
DMA-7_HYDRO             5:40       0.02
DMA-7_HYDRO             5:45       0.02
DMA-7_HYDRO             5:50       0.02
DMA-7_HYDRO             5:55       0.02
DMA-7_HYDRO             6:00       0.02
;
DMA-8_HYDRO             0:00       0
DMA-8_HYDRO             0:05       0.01
DMA-8_HYDRO             0:10       0.01
DMA-8_HYDRO             0:15       0.01
DMA-8_HYDRO             0:20       0.01
DMA-8_HYDRO             0:25       0.01
DMA-8_HYDRO             0:30       0.01
DMA-8_HYDRO             0:35       0.01
DMA-8_HYDRO             0:40       0.01
DMA-8_HYDRO             0:45       0.01
DMA-8_HYDRO             0:50       0.01
DMA-8_HYDRO             0:55       0.01
DMA-8_HYDRO             1:00       0.01
DMA-8_HYDRO             1:05       0.01
DMA-8_HYDRO             1:10       0.01
DMA-8_HYDRO             1:15       0.01
DMA-8_HYDRO             1:20       0.01
DMA-8_HYDRO             1:25       0.01
DMA-8_HYDRO             1:30       0.01
DMA-8_HYDRO             1:35       0.01
DMA-8_HYDRO             1:40       0.01
DMA-8_HYDRO             1:45       0.01
DMA-8_HYDRO             1:50       0.01
DMA-8_HYDRO             1:55       0.01
DMA-8_HYDRO             2:00       0.01
DMA-8_HYDRO             2:05       0.01
DMA-8_HYDRO             2:10       0.01
DMA-8_HYDRO             2:15       0.01
DMA-8_HYDRO             2:20       0.01
DMA-8_HYDRO             2:25       0.01
DMA-8_HYDRO             2:30       0.01
DMA-8_HYDRO             2:35       0.01
DMA-8_HYDRO             2:40       0.01
DMA-8_HYDRO             2:45       0.01
DMA-8_HYDRO             2:50       0.01
```

```
DMA-8_HYDRO              2:55       0.01
DMA-8_HYDRO              3:00       0.01
DMA-8_HYDRO              3:05       0.01
DMA-8_HYDRO              3:10       0.02
DMA-8_HYDRO              3:15       0.02
DMA-8_HYDRO              3:20       0.02
DMA-8_HYDRO              3:25       0.02
DMA-8_HYDRO              3:30       0.02
DMA-8_HYDRO              3:35       0.02
DMA-8_HYDRO              3:40       0.03
DMA-8_HYDRO              3:45       0.03
DMA-8_HYDRO              3:50       0.04
DMA-8_HYDRO              3:55       0.05
DMA-8_HYDRO              4:00       0.07
DMA-8_HYDRO              4:05       0.27
DMA-8_HYDRO              4:10       0.04
DMA-8_HYDRO              4:15       0.03
DMA-8_HYDRO              4:20       0.02
DMA-8_HYDRO              4:25       0.02
DMA-8_HYDRO              4:30       0.02
DMA-8_HYDRO              4:35       0.01
DMA-8_HYDRO              4:40       0.01
DMA-8_HYDRO              4:45       0.01
DMA-8_HYDRO              4:50       0.01
DMA-8_HYDRO              4:55       0.01
DMA-8_HYDRO              5:00       0.01
DMA-8_HYDRO              5:05       0.01
DMA-8_HYDRO              5:10       0.01
DMA-8_HYDRO              5:15       0.01
DMA-8_HYDRO              5:20       0.01
DMA-8_HYDRO              5:25       0.01
DMA-8_HYDRO              5:30       0.01
DMA-8_HYDRO              5:35       0.01
DMA-8_HYDRO              5:40       0.01
DMA-8_HYDRO              5:45       0.01
DMA-8_HYDRO              5:50       0.01
DMA-8_HYDRO              5:55       0.01
DMA-8_HYDRO              6:00       0.01
;
DMA-10_HYDRO             0:00       0
DMA-10_HYDRO             0:05       0.01
DMA-10_HYDRO             0:10       0.01
DMA-10_HYDRO             0:15       0.01
DMA-10_HYDRO             0:20       0.01
DMA-10_HYDRO             0:25       0.01
DMA-10_HYDRO             0:30       0.01
DMA-10_HYDRO             0:35       0.01
DMA-10_HYDRO             0:40       0.01
DMA-10_HYDRO             0:45       0.01
DMA-10_HYDRO             0:50       0.01
DMA-10_HYDRO             0:55       0.01
DMA-10_HYDRO             1:00       0.01
DMA-10_HYDRO             1:05       0.01
DMA-10_HYDRO             1:10       0.01
DMA-10_HYDRO             1:15       0.01
DMA-10_HYDRO             1:20       0.01
DMA-10_HYDRO             1:25       0.01
```

```
DMA-10_HYDRO             1:30       0.01
DMA-10_HYDRO             1:35       0.01
DMA-10_HYDRO             1:40       0.01
DMA-10_HYDRO             1:45       0.01
DMA-10_HYDRO             1:50       0.01
DMA-10_HYDRO             1:55       0.01
DMA-10_HYDRO             2:00       0.01
DMA-10_HYDRO             2:05       0.01
DMA-10_HYDRO             2:10       0.01
DMA-10_HYDRO             2:15       0.01
DMA-10_HYDRO             2:20       0.01
DMA-10_HYDRO             2:25       0.01
DMA-10_HYDRO             2:30       0.01
DMA-10_HYDRO             2:35       0.01
DMA-10_HYDRO             2:40       0.02
DMA-10_HYDRO             2:45       0.02
DMA-10_HYDRO             2:50       0.02
DMA-10_HYDRO             2:55       0.02
DMA-10_HYDRO             3:00       0.02
DMA-10_HYDRO             3:05       0.02
DMA-10_HYDRO             3:10       0.02
DMA-10_HYDRO             3:15       0.02
DMA-10_HYDRO             3:20       0.02
DMA-10_HYDRO             3:25       0.03
DMA-10_HYDRO             3:30       0.03
DMA-10_HYDRO             3:35       0.03
DMA-10_HYDRO             3:40       0.03
DMA-10_HYDRO             3:45       0.04
DMA-10_HYDRO             3:50       0.05
DMA-10_HYDRO             3:55       0.07
DMA-10_HYDRO             4:00       0.10
DMA-10_HYDRO             4:05       0.35
DMA-10_HYDRO             4:10       0.05
DMA-10_HYDRO             4:15       0.04
DMA-10_HYDRO             4:20       0.03
DMA-10_HYDRO             4:25       0.02
DMA-10_HYDRO             4:30       0.02
DMA-10_HYDRO             4:35       0.02
DMA-10_HYDRO             4:40       0.02
DMA-10_HYDRO             4:45       0.02
DMA-10_HYDRO             4:50       0.01
DMA-10_HYDRO             4:55       0.01
DMA-10_HYDRO             5:00       0.01
DMA-10_HYDRO             5:05       0.01
DMA-10_HYDRO             5:10       0.01
DMA-10_HYDRO             5:15       0.01
DMA-10_HYDRO             5:20       0.01
DMA-10_HYDRO             5:25       0.01
DMA-10_HYDRO             5:30       0.01
DMA-10_HYDRO             5:35       0.01
DMA-10_HYDRO             5:40       0.01
DMA-10_HYDRO             5:45       0.01
DMA-10_HYDRO             5:50       0.01
DMA-10_HYDRO             5:55       0.01
DMA-10_HYDRO             6:00       0.01
;
LID_RAIN                 0          0
```

LID_RAIN	6	0
;		
DMA_4_HYDRO	0:00	0
DMA_4_HYDRO	0:06	0.02
DMA_4_HYDRO	0:12	0.02
DMA_4_HYDRO	0:18	0.03
DMA_4_HYDRO	0:24	0.03
DMA_4_HYDRO	0:30	0.03
DMA_4_HYDRO	0:36	0.03
DMA_4_HYDRO	0:42	0.03
DMA_4_HYDRO	0:48	0.03
DMA_4_HYDRO	0:54	0.03
DMA_4_HYDRO	1:00	0.03
DMA_4_HYDRO	1:06	0.03
DMA_4_HYDRO	1:12	0.03
DMA_4_HYDRO	1:18	0.03
DMA_4_HYDRO	1:24	0.03
DMA_4_HYDRO	1:30	0.03
DMA_4_HYDRO	1:36	0.03
DMA_4_HYDRO	1:42	0.03
DMA_4_HYDRO	1:48	0.03
DMA_4_HYDRO	1:54	0.04
DMA_4_HYDRO	2:00	0.04
DMA_4_HYDRO	2:06	0.04
DMA_4_HYDRO	2:12	0.04
DMA_4_HYDRO	2:18	0.04
DMA_4_HYDRO	2:24	0.04
DMA_4_HYDRO	2:30	0.04
DMA_4_HYDRO	2:36	0.05
DMA_4_HYDRO	2:42	0.05
DMA_4_HYDRO	2:48	0.05
DMA_4_HYDRO	2:54	0.05
DMA_4_HYDRO	3:00	0.06
DMA_4_HYDRO	3:06	0.06
DMA_4_HYDRO	3:12	0.06
DMA_4_HYDRO	3:18	0.07
DMA_4_HYDRO	3:24	0.07
DMA_4_HYDRO	3:30	0.09
DMA_4_HYDRO	3:36	0.09
DMA_4_HYDRO	3:42	0.11
DMA_4_HYDRO	3:48	0.13
DMA_4_HYDRO	3:54	0.19
DMA_4_HYDRO	4:00	0.27
DMA_4_HYDRO	4:06	1.03
DMA_4_HYDRO	4:12	0.15
DMA_4_HYDRO	4:18	0.10
DMA_4_HYDRO	4:24	0.08
DMA_4_HYDRO	4:30	0.07
DMA_4_HYDRO	4:36	0.06
DMA_4_HYDRO	4:42	0.05
DMA_4_HYDRO	4:48	0.05
DMA_4_HYDRO	4:54	0.04
DMA_4_HYDRO	5:00	0.04
DMA_4_HYDRO	5:06	0.04
DMA_4_HYDRO	5:12	0.04
DMA_4_HYDRO	5:18	0.03
DMA_4_HYDRO	5:24	0.03

```
DMA_4_HYDRO                 5:30       0.03
DMA_4_HYDRO                 5:36       0.03
DMA_4_HYDRO                 5:42       0.03
DMA_4_HYDRO                 5:48       0.03
DMA_4_HYDRO                 5:54       0.03
DMA_4_HYDRO                 6:00       0.02

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

[TAGS]

[MAP]
DIMENSIONS 191.920 4920.830 1021.827 5718.627
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
BYPASS_DMA-3     396.944            5064.184
BYPASS_DMA-5B    436.183            5162.282
BYPASS_DMA-5C    495.042            5202.502
BYPASS_DMA-6A    790.316            5179.939
BYPASS_DMA-6B    899.205            5214.273
BYPASS_DMA-7     869.775            5136.776
BYPASS_DMA-8     932.558            5103.423
BYPASS_DMA-5A    404.792            5118.138
BYPASS_DMA-10    920.786            5060.260
DMA_1            577.533            5510.739
DMA_2            759.924            5508.403
POC-1            682.918            5066.445
DMA_4            853.161            5506.643
BMP-1            617.664            5242.722
BMP-2            747.153            5252.532

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

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
BMP_1            576.336            5431.700
BMP_1            576.336            5431.700
BMP_2            790.698            5429.305
BMP_2            790.698            5429.305

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
LID_RAIN         702.079            5580.197
```

APPENDIX D

Project Maps

- Existing Conditions Hydrology Map
- Developed Conditions Hydrology Map

2.9

DMA 1

1.9

DMA 2

N40°02'41"E ~ 420.00'

N35°10'08"E ~ 441.02'

N52°31'18"W ~ 257.00'

N37°28'42"E ~ 380.22'

D=02°42'00" R=2063.00' L=97.22'

N49°49'18"W ~ 13.00'

N40°10'42"E ~ 211.95'

N52°31'18"W ~ 158.00'

HIGHWAY 76

THOROUGHBRED LN

LEGEND

- SUBAREA BASIN BOUNDARY
- INITIAL AREA BOUNDARY
- FLOW DIRECTION
- 100.0 — RATIONAL METHOD NODE
- 0.08 — AREA (AC)
- 610 — EXISTING CONTOUR

0 30 60 FEET

SCALE: 1" = 30'

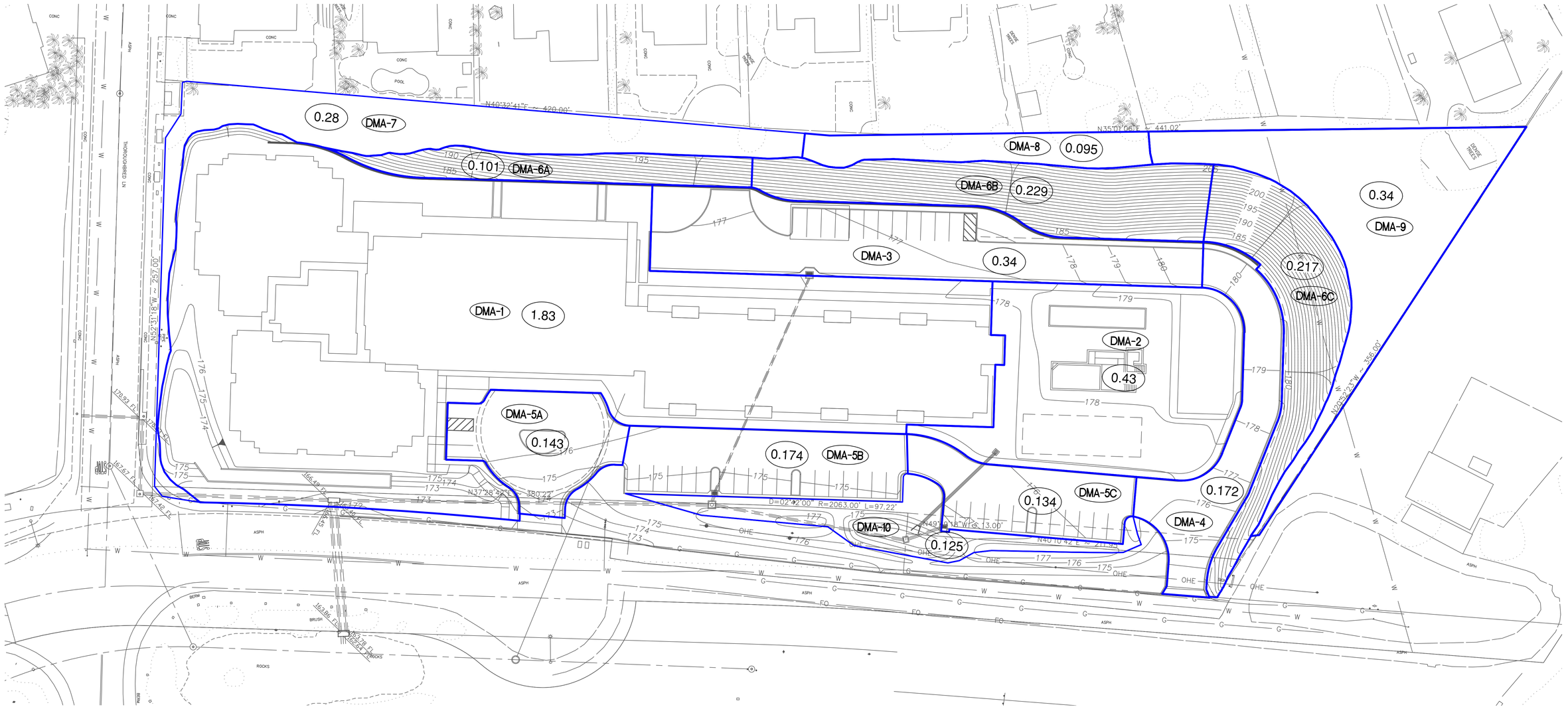
TORY R. WALKER ENGINEERING

RELIABLE SOLUTIONS IN WATER RESOURCES

122 CIVIC CENTER DR, STE 206, VISTA, CA 92084 · 760-414-9212

CAREFIELD SENIOR CARE FACILITY
BONSALL, CALIFORNIA

EXISTING CONDITION HYDROLOGY MAP



LEGEND

- SUBAREA BASIN BOUNDARY
- INITIAL AREA BOUNDARY
- FLOW DIRECTION
- 100.0 — RATIONAL METHOD NODE
- 0.08 — AREA (AC)
- 610 — EXISTING CONTOUR

0 30 60 FEET

SCALE: 1" = 30'

TORY R. WALKER ENGINEERING
RELIABLE SOLUTIONS IN WATER RESOURCES
122 CIVIC CENTER DR, STE 206, VISTA, CA 92084 · 760-414-9212

CAREFIELD SENIOR CARE FACILITY
BONSALL, CALIFORNIA

DEVELOPED CONDITION HYDROLOGY MAP